

THE IRON AGE

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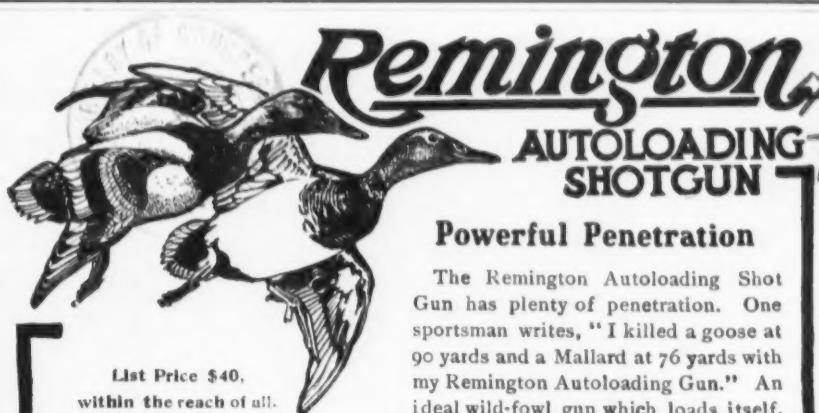
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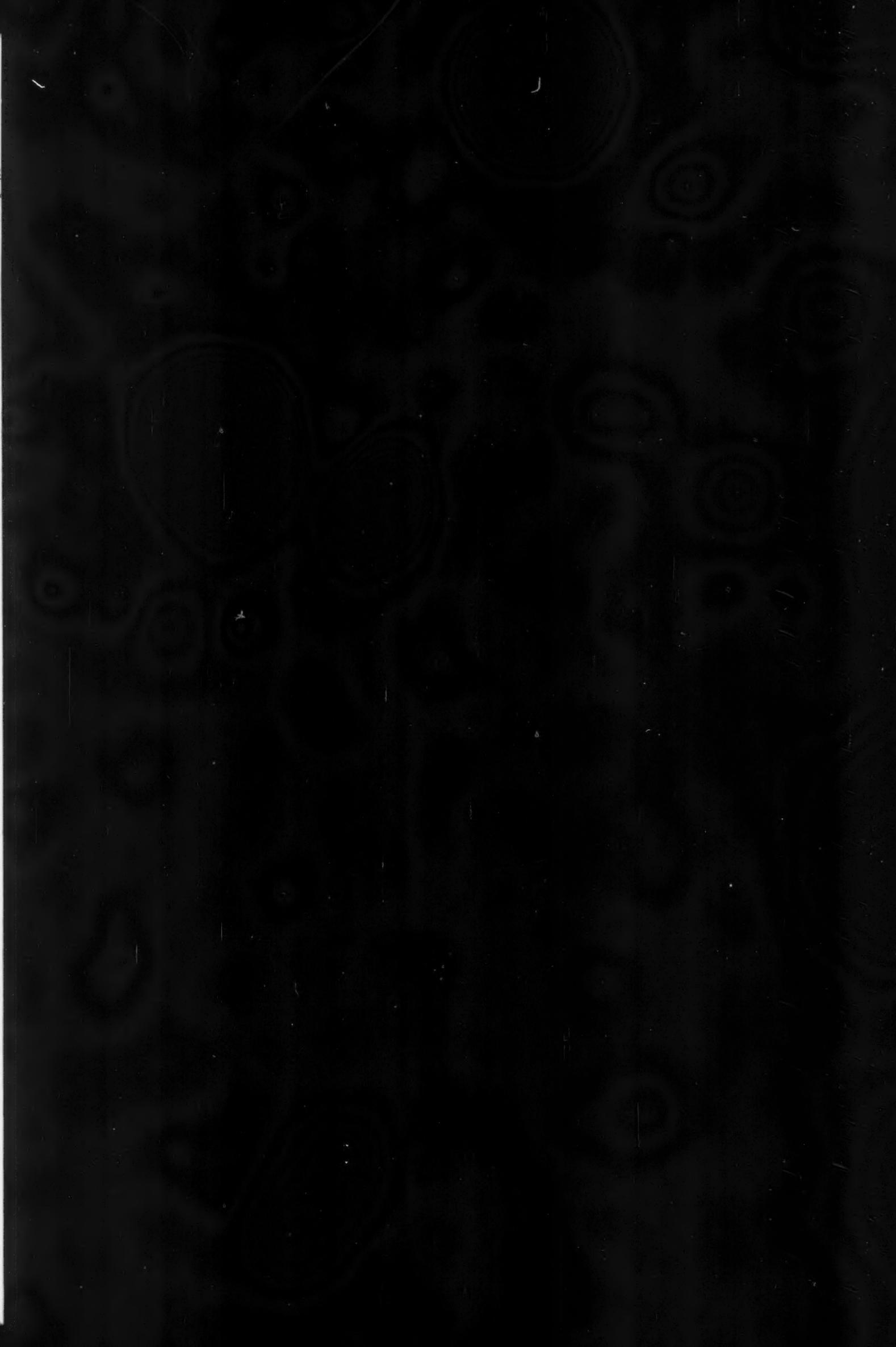
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THE IRON AGE

New York, Thursday, October 3, 1907.

The Bullard Vertical Turret Lathe.

From a first glance at the illustration it seems a little arbitrary to apply a new name—vertical turret lathe—to a form of machine that custom has established as a vertical boring and turning mill. Such it truly is, but it is more, too, for it combines the advantages of a vertical mill and a horizontal turret lathe on all face plate and chucking work. It is for that reason that the designer, E. P. Bullard, Jr., of the Bullard Machine Tool Company, Bridgeport, Conn., has selected this new name; it is more appropriate because it is more comprehensive. This new tool, in capabilities at least, does more nearly resemble a turret lathe turned on end than it does the usual vertical boring and turning mill. To perform rapidly and

space of a horizontal turret lathe of equal capacity. In exact figures the floor space required is 71 x 83 in., and the weight is 11,300 lb.

The machine contains many decided departures from general machine tool practices, but its evolution is not difficult to trace. The Bullard Company has been specializing for years in the manufacture of single and double head vertical boring and turning mills. Double head machines with independent feeds for each head had the greater productive capacity, but the second head, particularly in smaller machines, was often useless because it could not be brought into action unless swiveled to an excessive angle and undesirably extended from its sup-

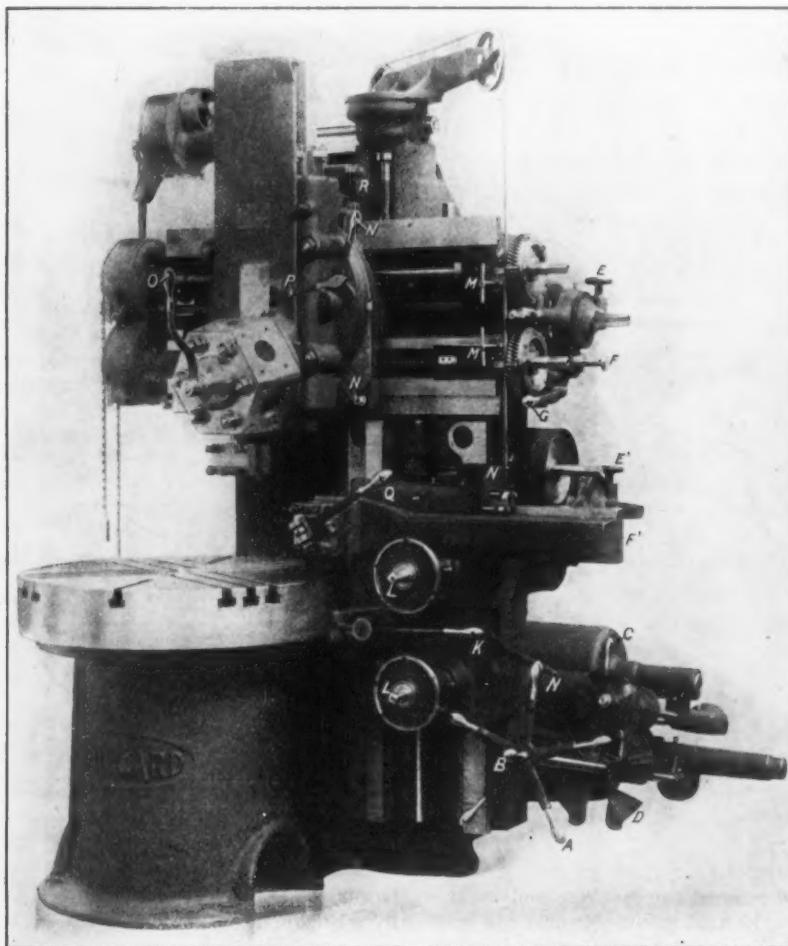


Fig. 1.—The 36 In. Rapid Production Vertical Turret Lathe Built by the Bullard Machine Tool Company, Bridgeport, Conn.

most conveniently, without elaborate tool equipment, all kinds of turret lathe chucking work, was the end in view when it was designed. It is offered as a multipurpose machine tool for increasing output and decreasing cost, of all face plate work within its range. Anything within the cylindrical dimensions of 3 ft. diameter by 2 ft. can be turned, bored, faced or threaded in this machine. The principal advantage over a horizontal machine is the simpler tool equipment required because the main turret head on the cross rail has a full universal movement, both vertical and horizontal throughout the range of the machine; expensive overhanging cathead cutters are thereby rendered unnecessary. Another advantage is that of any vertical machine—greater facility in setting work, and incidentally it occupies only about one-third the floor

porting saddle. For safety's sake speeds and feeds were necessarily reduced, and little if any advantage in saving of time was effected.

In 1900 the designer of this machine conceived the idea of turning that part of the rail carrying the second head to a right angle with the cross rail; in other words, making it a side head, so that the two tools could be worked on pieces of small diameter. The first machine produced with this modification had only two mechanical speed changes, carried a turret head with a vertically movable saddle on a stationary cross rail, and a cross slide on vertical ways on the bed. Six of these machines in practical operation were under observation for four years, and the knowledge gained from them resulted in an entirely new machine, with an improved side head, placed

on the market in 1904. To this several features have been added, and the vertical turret lathe, as it is now called, represents the development to date.

As now constructed the machine has an exceptionally rigid bed of internally braced vertical box construction, and on this are mounted a cross and a vertical rail. These two rails are practically a unit, and may be adjusted vertically by power to dispose the slides to best advantage according to the height of the work. In a forward extension of the base the table spindle is supported. It is of large size, and, being immersed in oil, is effectively lubricated. The spindle bearing is designed for a normal pressure of 12 lb. per square inch. With work of the maximum weight which it is possible to get in the machine it could not exceed 50 lb. per square inch. The two heads, a main vertical head and a side head, are independent in all their functions, movable in all direc-

motor on the machine, nor on an attached bracket, as it is preferable to belt it from an independent mounting, since this results in better finish of the work.

A quick acting brake stops the table where desired and a surface speed indicator guides the operator in obtaining maximum production. There are eight feed changes for each head, independent in direction and amount, ranging from 1-96 to $\frac{1}{2}$ in. per revolution of the table, and all feeds have micrometer index dials reading to thousandths of an inch. A feature in connection with the latter is the provision of adjustable indicators, which make it possible to reproduce work without losing time in measuring the work. The indicators are claimed to be better than trips and stops and to enable just as exact duplicate work without requiring much skill on the part of the operator. The guides may be set by the foreman on the first job, and be followed thereafter by the operator

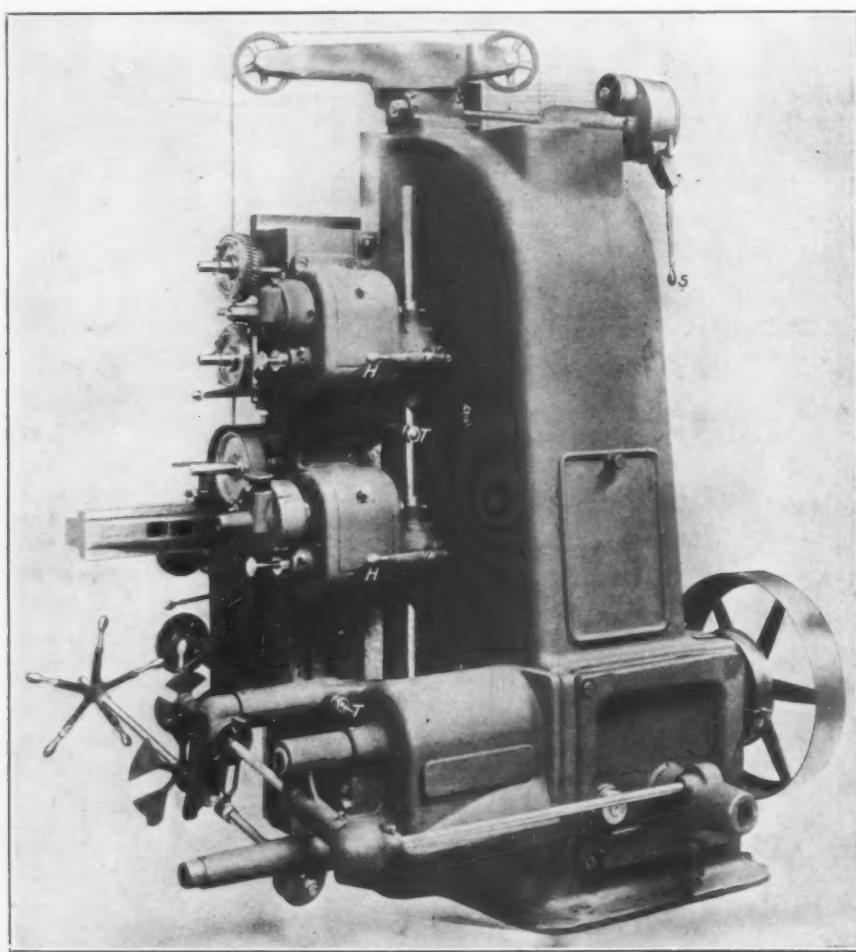


Fig. 2.—Rear View of the Bullard Vertical Turret Lathe.

tions and capable of working in close proximity. The side head is an integral part of the machine and an important factor in the rapid production of work. It may be used on work of small diameter simultaneously with the main head without interference, and it does not limit the swing of the machine. There are six sides on the overhead turret and four on the side head turret. Maintenance of turret alignment is effected by adjustable taper gibs on both the front and back bearings; the saddle is solid square locked throughout.

Fifteen table speeds, from 2.9 to 39 rev. per min., are provided from a single speed driving pulley, any one of which is instantly available, and an interlocking system of speed control prevents any conflict. Similarly safety friction slipping devices are provided in the driving gears to guard the feed works from injury by careless manipulation. All speed and feed changes are easily and quickly made and do not involve any changing of gears or shifting of belts. The machine is intended, when electrically driven, to use a 10-hp. motor, which may be of constant speed type, but it has done work corresponding to 20 or 30 hp. No arrangement is made for mounting the

without special effort or thought. The main head has power rapid traverse, vertically and horizontally, protected against accident by overtravel, by slipping of the belt, and both heads and all moving parts have adjustments for preserving absolute alignment. Positive lubrication is provided for all wearing parts.

Operation of Machine.

The driving mechanism closely resembles that of the 54-in. Bullard boring mill, described in *The Iron Age*, November 30, 1905. It is comparable to that of a horizontal lathe with single belt speed and gear box for mechanical speed changes. The speeds are obtained through a set of gears and friction clutches in the speed box at the side of the machine, shown in Fig. 1, in connection with three sets of reducing gears mounted as a unit inside of the bed and transmitting the power to the table by spur pinion and internal gear. The gears in the bed are analogous to the headstock of a lathe and divide the speed changes into three series—slow, medium and fast. Each series is again divided by the speed box into five speeds—slow, medium slow, medium, medium fast and fast. It

is to be remarked that there is no step up in the gear train; the first motion shaft runs the fastest of all, and there is a continuous drop between it and the table.

The controlling means for changing the table speeds may be likened to the steering wheel of an automobile. The pilot wheel A controls the changes in the speed box, each spoke indicating one speed, which is engaged only when its corresponding spoke is in the vertical position. When the shaft carrying the pilot wheel is lifted by the handle B the quick acting brake is applied. The three headstock changes are controlled by the lever C, and its three positions indicate the series of speeds available. To make conflict between the movements of these levers impossible they are all interlocking, and only one speed

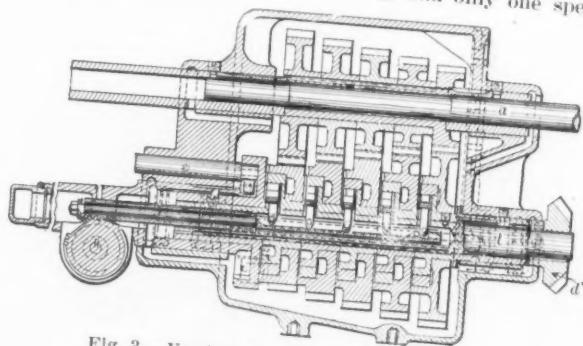


Fig. 3.—Vertical Section of the Speed Box.

change can be made at a time. Change in engagement of the positive clutches in the headstock gears can only be made when the brake is set and the speed box disengaged, as will be understood from the rear view, Fig. 2. A dog connected to the brake lever shaft must first be disengaged from the slots in the disk on the shaft controlling the headstock gears, and the brake cannot be again released until a change has been fully accomplished and another slot registers with the dog. The speed box changes cannot be made unless the brake is disengaged, as at other times the interlocking disk and yoke, D, Fig. 1, cannot be revolved; the same disk holds the brake out while any of the spokes of the pilot wheel are in a vertical position. So long as a friction is engaged the brake cannot be applied, and the clutches in the speed box are thereby protected. Rapid manipulation of the machine is not hampered by this interlocking system, as all of the levers are in easy reach of the operator when standing where all other parts are most conveniently handled. Figures on the arms of the interlocking disk D on the pilot wheel rod, when exposed through the slots of the disk attached to lever C, and with reference to arrows at the sides of the slots, indicate the speed of the table in revolutions per minute as then set.

Although identical in design the feed works of each head are absolutely independent. The eight changes are obtained in two series of four, by opposed cones of gears constantly in mesh, driving keys being selectively set by two handles on each feed box. Changes in feed to the main head are made through the wheel E, and similarly for the side head through wheel E'. The positions of the racks operated by these wheels indicate the feed obtained with reference to graduations. There are two feeds for each mark on the index, this change being made by the clutch rod F for the main head and F' for the side head. As the illustrations show there are no pull gears on the various feed rods. Either vertical or horizontal movement of the head on the cross rail is effected by raising or lowering the drop worm located between the two rods, and operated by the lever G; in its midposition both feeds are out. The same changes in the direction of the side head feed are obtained by clutches operated by the lever K, Fig. 1. Its inward position starts the vertical feed, and its outward position the horizontal feed; the neutral position disengages both, and permits rapid hand movement of the side head and slide by a crank handle applied to the squared rods L. Collisions of the two heads are prevented from breaking gears by mounting the worm driving gears between two adjustable friction plates keyed to the rods and screws. Change in

the direction of feed is made by the reverse levers H, Fig. 2, at the rear of the feed works.

On each feed rod are adjustably mounted micrometer index dials, and indicators on the edges of these dials, numbered to correspond to the turret faces may be set at the proper micrometer reading as each finished dimension of the first piece is reached. Duplicate amounts of feed may be employed on subsequent pieces, and caliper and measuring for depth are avoided.

Rapid movement by power of the main head is conveniently controlled by the key handles, M, Fig. 1, at the right of the cross rail; the upper one is for vertical movement and the lower one for horizontal. Indicator plates show the resultant movement for each position of the key handles. These handles operate plungers which pass entirely through the speed rod and screw and actuate clutches in the boxes at the opposite end of the rail. Being driven from the first motion shaft, the speed of this mechanism is constant, and has no relation to the speed or movement of the table.

The binder levers N lock their respective saddles or slides stationary. The turret binder O and the lock pin lever P are manipulated between changes in the face of turret presented. For the side head turret the handle Q acts as both binder and lock. The main head may be swiveled when the binder bolts are released by turning the worm stud R, and graduations indicate the angle obtained. Raising or lowering of the cross and side rails as a unit is accomplished by power independently of the table by manipulating the lever S, Fig. 2. When in desired position the rails are locked by the binder bolts T.

Details of Construction.

The driving pulley shaft extends clear through the machine to the speed box, a section of which is given in Fig. 3. In the latter, a is the continuation of the main driving shaft, and has keyed to it a nest of five cone gears. These are in constant mesh with the corresponding gears loosely mounted on the shaft b, and engaged by friction clutches in the manner indicated; it is pos-

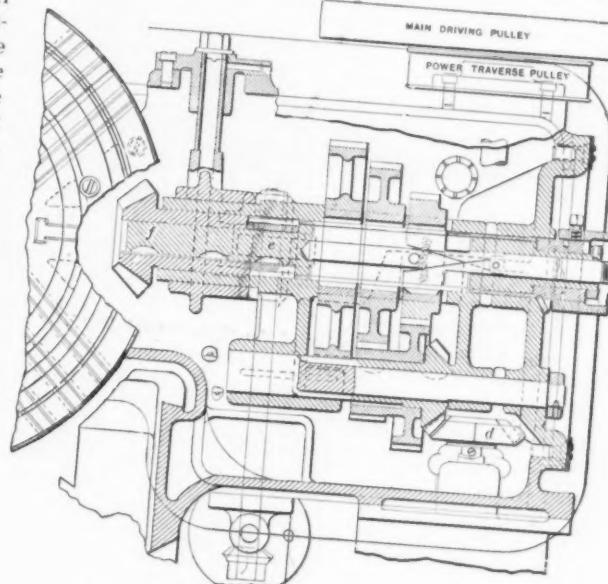


Fig. 4.—Horizontal Section of the Headstock.

sible to engage only one at a time. A rack rod on the interior of the hollow shaft b carries a wedge adapted to depress the pins in any one of the clutches so as to expand the band recessed in the gears, placing the corresponding gear in action for the time being. The rod is reciprocated by a pinion meshing with it and mounted on the steering wheel rod carrying the pilot wheel A, Fig. 1. Swinging this rod vertically actuates the brake c by the expanding of an internal friction ring, between the ends of which is inserted a square key with a projecting lug adapted to be engaged by a corresponding projection mounted as a collar on the casting containing the bearings of the clutch operating pinion.

The inner end of the shaft *b* carries the bevel gear *d*. This gear, designated by the same letter in Fig. 4, engages a bevel gear on a shaft with three spur gears forming a cone, which mesh with loosely mounted gears on the shaft *e* of the headstock. The three latter gears are engaged with their shaft by driving keys in the manner indicated, and give the three changes of speed for each of the five changes obtained through the speed box. The shaft *e* carries the miter pinion *f*, which engages another attached to a spur pinion, and the latter, meshing an internal gear nearly the full diameter of the table, forms the final step in the transmission of power to the table

on the feed screw and are in constant mesh with driving gears, one giving direct and the other reverse rotation. The driving gears are driven from a pulley in each case; the belt is continuous and passes around these two pulleys with an adjustable idler between, around the driving pulley of the rail raising and lowering mechanism and the belt driving pulley on the main driving shaft. The knurled knob *i* controls a split nut and engages or disengages the horizontal feed to the head on the cross rail.

The ingenious counterbalancing of the vertical head also is partly shown in Fig. 5. The sprocket *j* carries a counterweight and is mounted on a square shaft, *k*. In

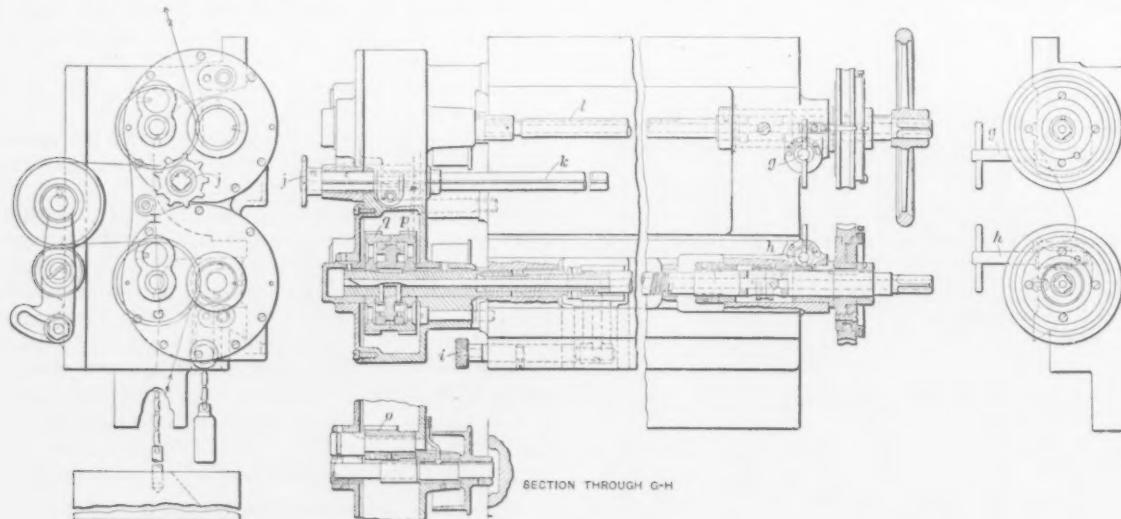


Fig. 5.—Elevations and Details of the Power Traverse for the Overhead Turret Slide.

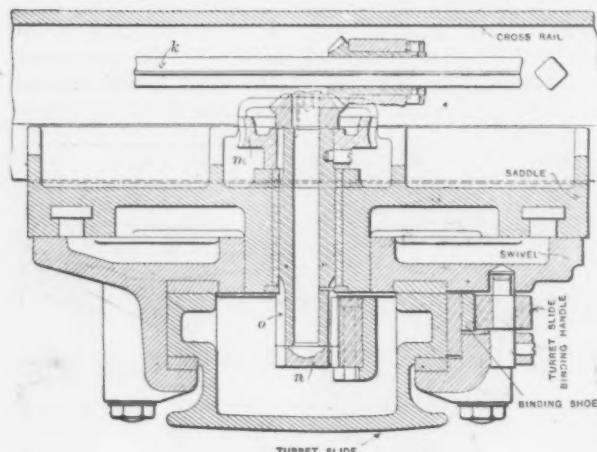


Fig. 6.—Horizontal Section of the Main Turret Head.

of the machine. The arrangement is therefore such that the drive has no tendency to lift the table. The driving keys engaging the gears on the shaft *e* are manipulated from the handle *C*, Fig. 1, the rotary motion which it imparts to the shaft on which it is mounted, being transmitted through right angle shafts and miter gears to a pinion and rack rod at the back of the machine, as seen in Fig. 2. The principle is much the same as that controlling the gears in the speed box, except that driving keys are used instead of clutch gears.

The controlling mechanism for the quick power traverse of the turret head on the cross rail is shown in Fig. 5, where *g* and *h* are the key handles *M* shown in Fig. 1. Each, through a pinion, manipulates a rack rod passing through the centers of the feed rod and feed screw, respectively. The motion up or down of the turret head slide is controlled by *g*, according to the direction in which it is twisted, and the movement of the head to the right or left on the cross rail is similarly controlled by *h*. The principle of the action is made clear in the case of the lower one controlled by *h*. The rod has tapered surfaces at its left end, so that when moved to the right or left it depresses one or the other of two pins operating friction gears. The gears are otherwise loose

Fig. 6. *k* is the continuation of this squared rod. It carries a miter gear meshing with one on a transverse shaft, the opposite end of which carries a pinion *n*, engaging a rack on the turret slide. The effect of the counterweight is to revolve this pinion in such a direction as to support the weight of the turret slide, but this pinion is independent of the one *o*, which is on a quill surrounding the shaft of the miter gear, and effects the raising and lowering of the slide when driven by the worm gear *m*; the effect of lost motion is thereby compensated. The

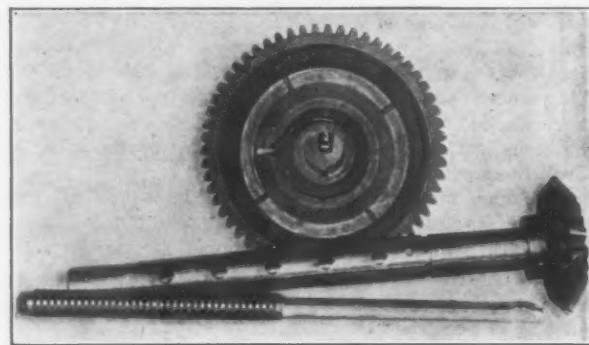


Fig. 7.—A Clutch and Parts from the Speed Box.

worm wheel is driven by a worm on the horizontal shaft *l*, Fig. 5, through which the vertical feeding and quick travel are derived.

Both the horizontal and vertical quick power movements of the turret slide are driven in essentially the same manner, and the construction, as shown for the lower mechanism in Fig. 5—that for the horizontal movement—is identical to that of the other. As shown in the detail section through G-H, the driving pulley carries a long pinion meshing with the intermediate gear *o*. This pinion also meshes with one of the friction gears, *p*. The diameter of *o* is enough larger than that of the driving pinion for it to mesh directly with the friction gear *q* and rotate it in the reverse of the direction of *p*. It will be seen from the drawing how the faces of the gears are cut away to clear one another and permit their being compactly assembled.

Fig. 7 shows the construction of the friction clutches

used throughout the machine. The spider is keyed to the shaft and the gear revolves freely upon it except when the friction is engaged by forcing the pin out and against the spring lever. While this type of friction is practically self-adjusting, the small wedge at the fulcrum point has been added to permit adjustment if desirable. In the speed box a removable cap is provided to give ac-

quantities required in filling the various receptacles when the machine is first put in operation. The table spindle bearing requires $\frac{1}{2}$ gal., headstock gears 5 gal., speed box gears $1\frac{1}{2}$ gal., feed boxes $\frac{1}{2}$ gal. each, power handling and rail raising brackets 1 quart each. Convenient means of filling and observing the level are provided in all cases. The driving pulley shaft has a separate oil well; all other bearings are lubricated through oil cups.

CAPABILITIES OF THE MACHINE.

An indication of the variety of work which it is possible to perform on the vertical turret lathe is afforded by the views of three typical operations, given in Figs. 8, 9 and 10. Each of the sockets in the main turret face may be made to hold a boring, reaming or thread cutting tool, and by means of special tool holders two turning tools may be used for each face. Fig. 8 shows a very

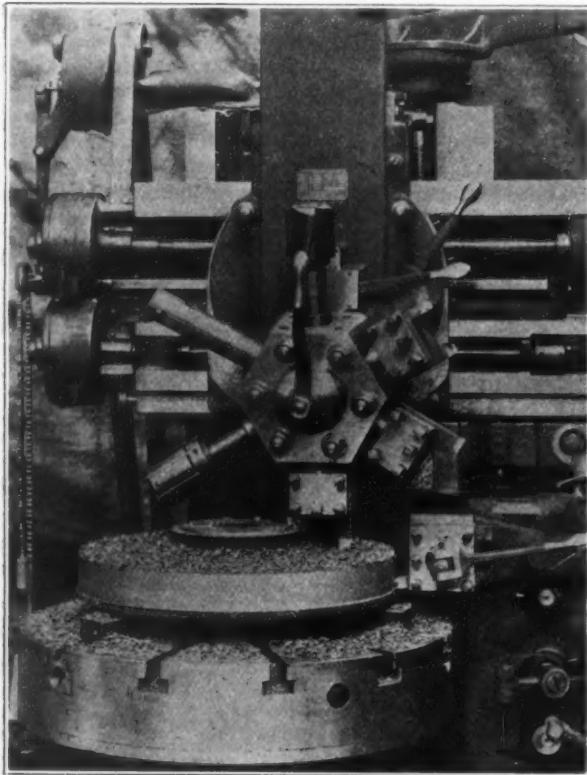


Fig. 8.—The Working Parts with Three Tools in Action.

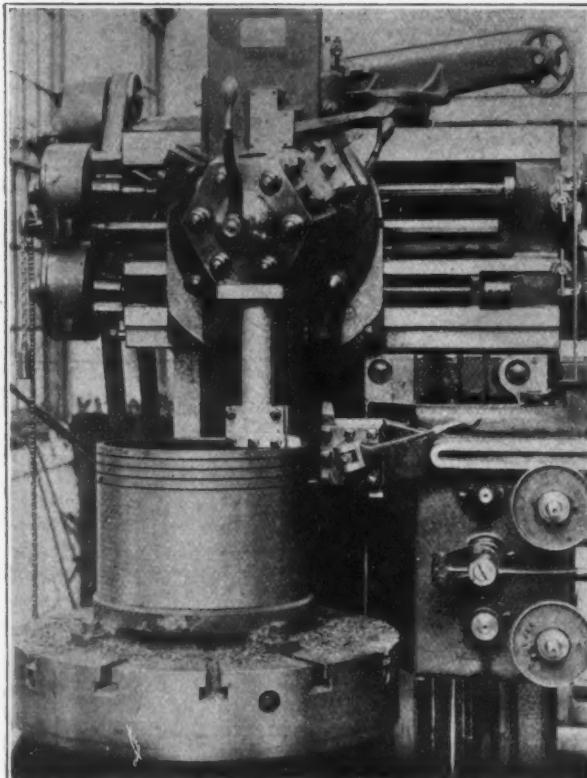


Fig. 9.—The Parts as Engaged in Turning Piston Rings.

cess to these adjusting points without necessitating disassembling.

All parts subject to wear have been given ample consideration in the matter of lubrication. The gears remain in a bath of oil, and gauges indicate when the proper level of oil is maintained. Some idea of the extensiveness of the lubrication may be had from the summation of the

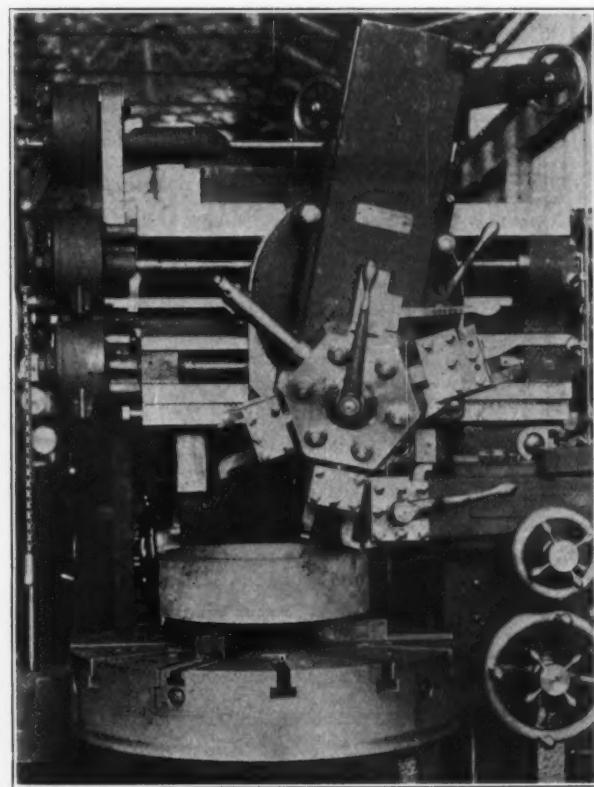


Fig. 10.—The Tools in the Two Heads Working Close Together.

complete complement of tools in both heads for performing at one setting all of the machining of one side of a gear blank. At the stage illustrated three tools are in simultaneous action. An economical way of turning piston rings is shown in Fig. 9, where the length of drum from which they are being cut is beyond what could be satisfactorily handled in a horizontal machine. There is obviously less waste in this process. The same illustration is indicative of what may be done in machining trunk pistons for gas engines. A view of the working parts with the vertical head swiveled is given in Fig. 10. It also shows a rather complete utilization of the turret faces and brings out strikingly how nearly tools in the two heads may be approached to one another. An appreciation of other capabilities of the machine may be had from the dimensions of the movements. The overhead turret slide has a vertical movement of 26 in. and a horizontal movement in excess of the maximum swing of the table, 36 in. The table itself is 34 in. in diameter. The side head has a vertical movement of 28 in. and may be extended horizontally 15 in. The vertical adjustment of the cross and side rails is 12 in. The main turret is 12 in. in diameter and has $2\frac{1}{2}$ -in. holes. The machine is regularly built with a plain table, to which four independent jaws may be fitted. As options, a table with a three-jaw combination chuck may be supplied, or four-jawed independent chucks built into the table. The thread cutting attachment for the vertical head is arranged for cutting 2, 3, 4, 5, 6, 8, 10, $11\frac{1}{2}$, 12 and 14 threads per inch and is furnished when desired.

The First Lake Dock of Steel.

Details of the Structure to Be Built at Two Harbors, Minn.

BY DWIGHT E. WOODBRIDGE.

The Duluth & Iron Range Railroad reaches Lake Superior at Two Harbors, 27 miles northeast of Duluth, and all its iron ore traffic is handled from that point. Its annual ore tonnage has grown until it is now from 8,000,000 to 9,000,000 gross tons per season of navigation, about 225 days. Iron ore is handled from cars to ships through specially designed shipping piers on the top of which trains run and beside which lie the waiting ships. The ore is dumped into dock pockets through the bottoms of hopper cars, each carrying 50 gross tons, and is carried in these pockets until wanted for loading the ships.

a steel pier will last 25 years its construction is justified, especially when the ever present danger of fire in a wooden dock and its serious consequences, are considered. While the life of a steel pier is absolutely undetermined by any precedents, it is entirely probable that it will last with proper care, much more than 25 years. A steel ore pier, in other words, is largely a matter of insurance and depreciation.

Small steel ore docks were built at Daiquiri on the island of Cuba, 12 or 14 years ago, and at that time were fully up to date. But so great has been the development of the industry that to-day they are on a par with the 10-ton freight car in the United States. Recently, after exhaustive studies in this country a steel ore pier was built at Narvik on the west coast of Norway for the shipment of Swedish ores, and it is said to be giving satisfaction. In 1902 a conveyor ore dock with no pockets was erected on the north coast of Spain by the Compania Vivero. This plant was arranged with a

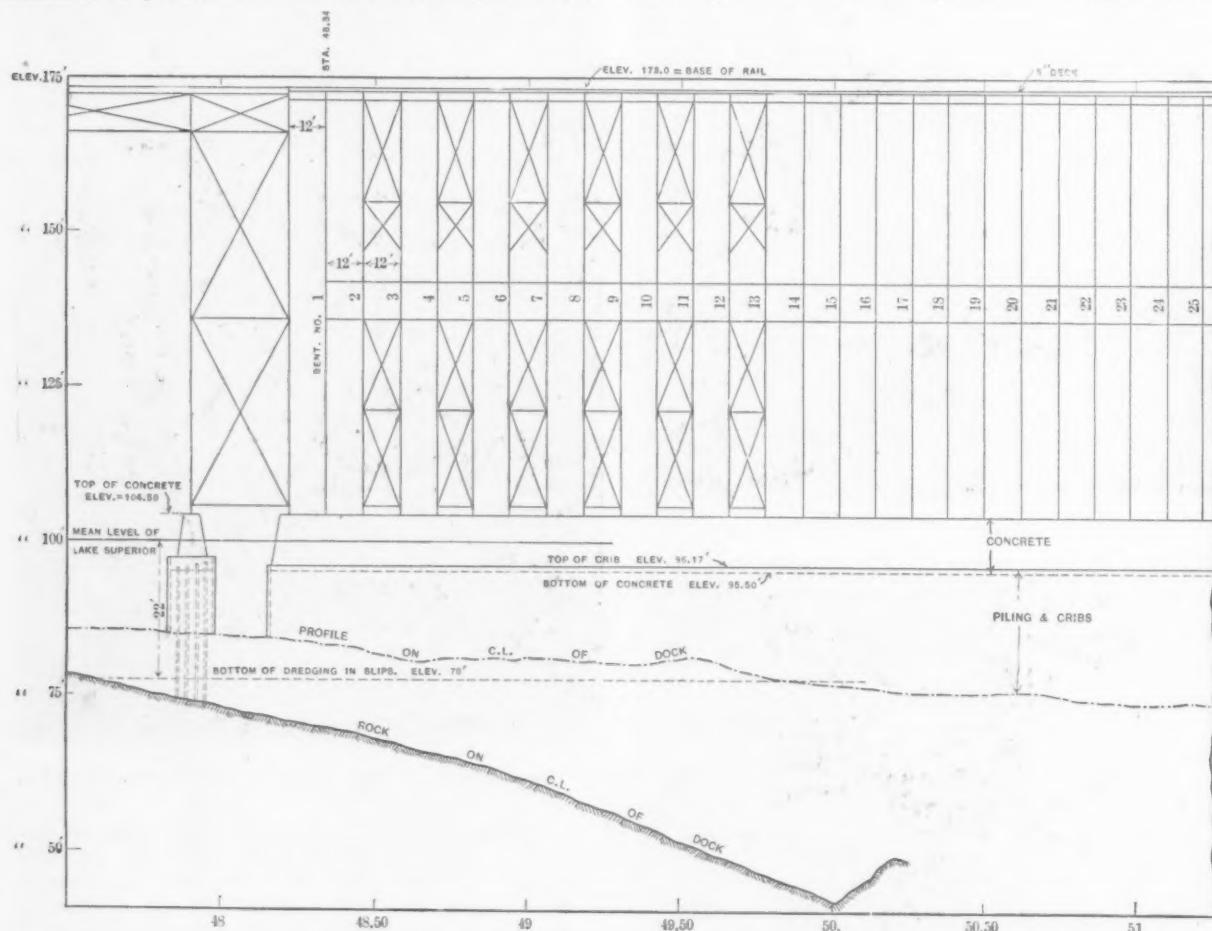


Fig. 1.—Elevation of a Portion of the Dock Proper Nearest the Approach, with Profile of Harbor Bottom and Cribbing and Concrete Work.

or is run directly through them into the hold of the vessel. In either case the operation must be by gravity, and the bottom of the ore pocket must be sufficiently high above water to permit the ore to slide freely out of the spouts and into the vessel, even when it is empty and high out of the water. The Duluth & Iron Range Railroad has five large docks, all of timber construction and generally similar to all those at upper lake ports, but it is about to erect an all-steel pier that is a new departure and presents many features of interest.

Steel and Wood Piers Compared.

The decision to use steel for construction was reached after long deliberation. There is an excess cost of about 50 per cent. over timber, even at the late high prices of the latter, so that roughly speaking the steel dock must have double the life of wood to make the investments equal per ton of ore shipped. A wood pier will last from ten or twelve years. The term of life is continually decreasing on account of the more and more severe class of service to which these docks are subjected and the heavier locomotives and trains that traverse them. If

cantilever arm for loading shipping anchored 400 ft. off the beach.

At Two Harbors, which is a port so restricted by both its size and shape that it is difficult to see how it can find space for another dock, there are now five docks for ore and two for coal and merchandise. The ore piers are from 1042 to 1388 ft. long, exclusive of approaches, and are spaced with from 130 to 200 ft. of water between them. No. 6 will be erected close to the western end of the harbor, and by reason of the lack of room between the steep and rocky shore and the government breakwater will be but 888 ft. long. It will be 200 ft. from No. 5. Between the ends of these several piers and the breakwater there is a space of only about 1,000 ft. radius, small enough for manipulating the modern lake ship 600 ft. or more in length.

The Need of Secure Anchorage.

The bottom of Lake Superior at Two Harbors is of shelving rock, covered by a thin medium of red clay, the original surface sloping from the water's edge at the shore line to some 38 ft. depth at the outer end of

the docks. Near the outer end the bottom has been shallowed somewhat by dredged material dumped there. But the piles for this new pier must be 54 ft. in average length and some are to be 70 ft. long. It is no small undertaking to anchor a structure of this character whose base rests in solid material 38 ft. below water level and whose deck is more than 110 ft. higher. This is especially true when the load of this structure varied instantly from nothing to maximum, carried in railroad trains of excessive weight which are shunted longitudinally on the upper deck of the structure, stopped by air brakes suddenly applied, the force of which must be absorbed by the structure in such a way as to tend continually to pull out the upper portion of the dock from its shore connection. In fact, so great is this longitudinal strain, that lake ore piers quite commonly get to leaning forward, the shore connection at their decks pull-

both directions. For this reason metal construction lends itself especially well to such jobs, and can be done at a far lower price per pound than almost any other form of steel erection.

No. 6 dock of the Duluth & Iron Range will have a timber trestle approach 213 ft. long, a steel approach beyond the wood 329 ft. long, will be itself 888 ft. long, with, therefore, 74 pockets on each side, and there will be an end protection crib 50 ft. long, making a total length of 1480 ft. The pockets will each have capacity for 320 gross tons, giving the dock a gross storage capacity for 37,360 tons and a shipping capacity in the lake season of approximately 1,500,000 tons. It will be 73 ft. high from the water, 53 ft. wide in the clear and the base of its ore pockets will be 40 ft. above water line. There will be four standard gauge tracks on the deck, two over each line of pockets.

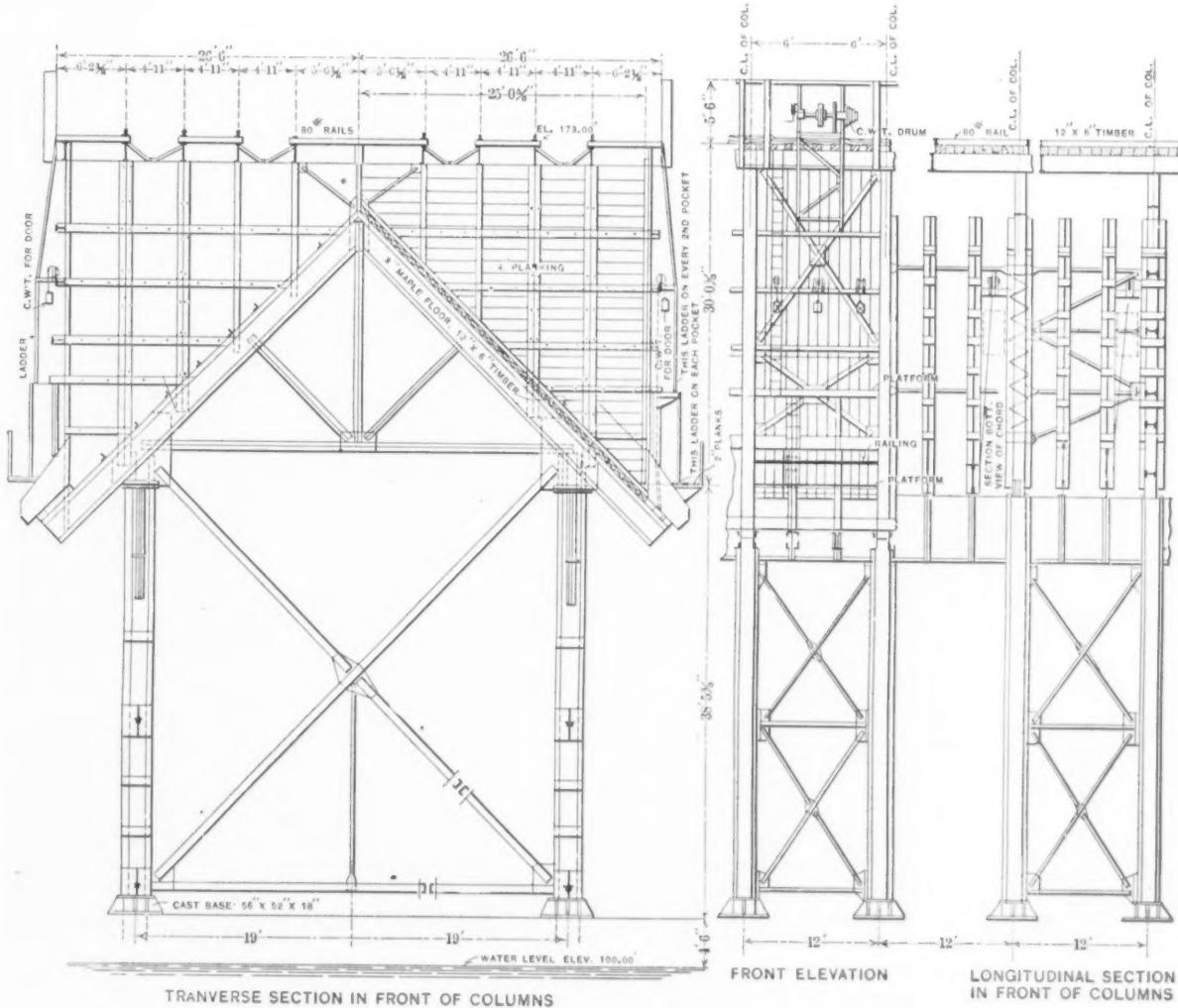


Fig. 2.—Sections and Front Elevation of the Steel Structure at Columns

ing away. The Duluth & Iron Range Railroad handles its ore in trains of 30 50-ton cars, pulled by 170-ton locomotives. The weight of moving load will thus be more than 5,000,000 lb. applied at a point 100 ft. or more above the foundation. In stopping by air brakes trains moving at a speed of, say, six miles an hour, there is inertia of some 11,000 hp. seconds to be absorbed by the structure. These ore trains are switched on docks with larger and larger engines and loads every year, and they are stopped in about three seconds.

Dimensions and Capacity.

An ore pier is a series of 12-ft units, based on the spacing of ore cars and ships' hatches. The cars are 24 ft. centers and the hatches are either 12 ft. between centers, as in many of the newer ships, or 24 ft., as formerly. All ore piers, cars and ships on the great lakes, without exception, conform to this standard. An ore pier is, therefore, a double triangular pocket lifted above the water on foundations sufficiently high for the purpose, repeated indefinitely and properly braced in

Material Required

The structure will contain approximately 12,000,000 lb. of steel, 300,000 linear feet of piling for foundations, 4,000,000 ft. of hemlock lumber for submerged crib construction, 35,000 cu. yd. of rock filling for the cribs, 12,000 cu. yd. of concrete and 2,500,000 ft. of timber for lining pockets, for decks and walks. Counting about \$15,000 for dredging and \$64,000 for grading tracks and yards, the cost of the dock is estimated at \$1,150,000. A timber structure of the same size and capacity would cost about \$800,000. Contracts for the foundation work, piling, cribs, rock and concrete have been let to the Barnett & Record Company, of Duluth and Minneapolis, and for the steel superstructure in place to the American Bridge Company. It is generally understood that this latter contract is for less than \$500,000. Contracts for the hoisting gear for chutes and other minor details have not yet been let. The pockets will be equipped with the Carter patent front with three doors and a 12 ft. opening to each pocket, such as are in use at one dock at

Escanaba and at Duluth, with counterbalance hoists and conical drums for handling the chutes.

Foundations and Superstructure.

For the construction of the pier piles are driven to rock. Each crib section has two transverse rows of seven piles each, the rows being three feet centers, for the entire length of the dock. The two rows of piling are enclosed by solid cribbing of hemlock timbers, 12 by 12 and 12 by 8 in., driftbolted, and the crib filled with rock. The cribs rise to within 4 ft. of the water line, and monolithic longitudinal concrete piers extending from 4½ ft. under water to the same distance above are then built, the heads of the piles being left in the concrete. Fig. 1 is an elevation of the dock proper at the approach end, showing a profile of the harbor bottom and the lines of crib and concrete work. Upon the concrete piers rests the series of built-up steel towers. Fig. 2 shows both a section and a front elevation of the steel panels. Fig. 3 is a section

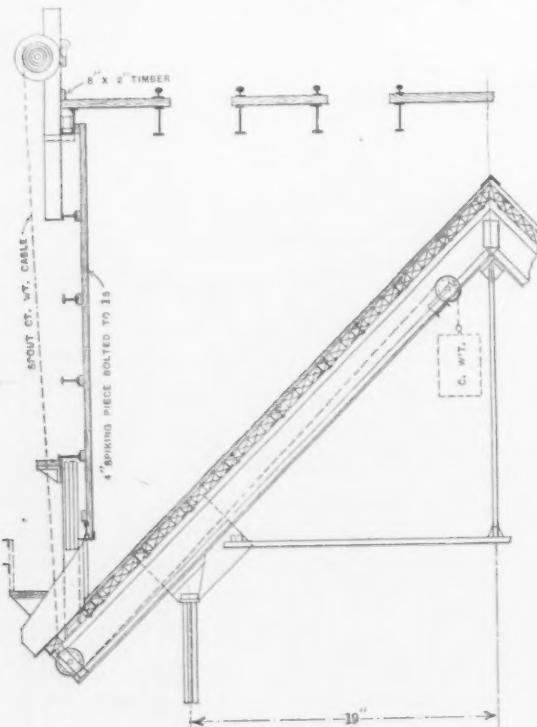


Fig. 3.—Section of an Ore Pocket.

through one of the ore pockets. The entire weight of the dock is carried on a series of built-up box members holding a truss, on which the ore is dropped and above which the tracks run. The steel columns are 38 ft. apart in the width of the dock, coming under the center of gravity of the load of ore and trains. Four 80-lb. rails are laid the full length of the dock on each side, giving two tracks over each pocket. These rails rest on longitudinal girders upheld by posts rising from the main floor of the pockets, those holding the outer rails being almost a continuation of the main posts. The pockets, which slope toward the front at an angle of 45 deg., are lined with a 3-in. maple floor, laid on 6-in. plank. In timber docks it is necessary that the outer posts come flush with the sides of the pockets. This is not needed in steel and the main posts are set back 7½ ft. This centers weights and materially simplifies construction. There will be 148 balanced hoists for the operation of spouts and counterweighted drums add to the ease and speed of handling the spouts.

Fender posts to guard the dock are set along both sides, spaced 6 ft. apart, and snubbing posts for ships' cables are set in the concrete at proper intervals. The heavy protection pier at the outer end of the dock is to guard against injury to the structure by impact from vessels.

Specifications for this structure were worked out by the engineering department of the Duluth & Iron Range Railroad, under direction of R. Angst, chief engineer, and in conjunction with the American Bridge Company,

and the erection will be under Mr. Angst's supervision. It is hoped that the dock may be put in use during the early part of 1908. Contractors for the substructure are now busy on the ground, and materials for the whole job are being assembled. Much of the steel work must be done during the inclement winter of Lake Superior.

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The Policy of the German Steel Syndicate.

Some significant utterances have recently emanated from the Stahlwerks-Verband, which has just announced that the books have been opened for orders for shapes for the home market at unchanged prices. In its market report under date of September 19, the management says:

As the statistics of shipments for the past month show, the strenuous work at the mills continues unabated, and the orders at hand justify counting on the same employment until the end of this year. In view of this, the reports current in the press seem inexplicable to the effect that an alleged restriction of output is contemplated, quite irrespective of the fact that these reports are in conflict with the syndicate agreement, which does not provide for any restriction of output, since the participation is in percentages. For that reason the production automatically adjusts itself to the demand, which to-day, as hitherto, fully requires the whole capacity of the works.

Nor is there more occasion for the syndicate to lower prices than to reduce output. In fixing prices for the A products (billets, track material and shapes), the steel syndicate has acted with moderation with the avowed purpose of creating a stable price level. The steel syndicate would be untrue to this principle if it did not now hold prices, particularly since there is no adequate reason for not so doing. Even though prices for B products (bars, plates, sheets, wire rods, &c.) have declined somewhat, they still are in a normal relation to the prices for A products, which have been kept low until now. It would be unjust to ask the steel syndicate to join in a rise in prices in a modest way and yet to follow a decline, at once to its full extent. Besides, as already stated, there is no occasion therefore, in view of the thoroughly satisfactory condition of the order books, so that the syndicate has no occasion particularly to urge its customers to purchase larger quantities.

A matter which deserves further earnest consideration is the uncertainty with reference to costs. The prices for raw materials and fuel are hardly likely to decline in the near future. On the other hand, the steady efforts to bring about changes in the labor and wages conditions in the metallurgical industry may lead to consequences whose importance cannot now be measured. Owners and managers regard the outlook in this respect as an exceedingly serious one, so that they are not inclined to enter into long time commitments.

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The Milwaukee Locomotive Mfg. Company has been incorporated at Milwaukee, Wis., with a capital stock of \$50,000. The company is organized to promote the manufacture of a new type of locomotive which has just been invented by Frederick P. Cook and Adolph N. Miller of Milwaukee. The locomotive is operated by gasoline and is particularly adapted for shunting freight cars around large industrial plants. The small expense of operating this type of engine will enable many more manufacturers to own a locomotive and to shunt cars as they may desire. For railroad construction, contractors' use, tunnel, forest and field work and in mines it will facilitate the handling of materials and will successfully meet all other requirements. A recent test of the new engine exceeded the expectations of the inventors. The locomotive, weighing only eight tons, hauled nine large freight cars, four of them being loaded cars. The weight of the train was 500,000 lb. The company plans to begin the manufacture of the engine on a large scale in the near future. The incorporators are Frederick P. Cook, Adolph N. Miller and William Woods Plankinton, the last named being a well-known capitalist of Milwaukee.

The Standard Track Scale.

A 600-Ton Suspension Steel Frame Scale.

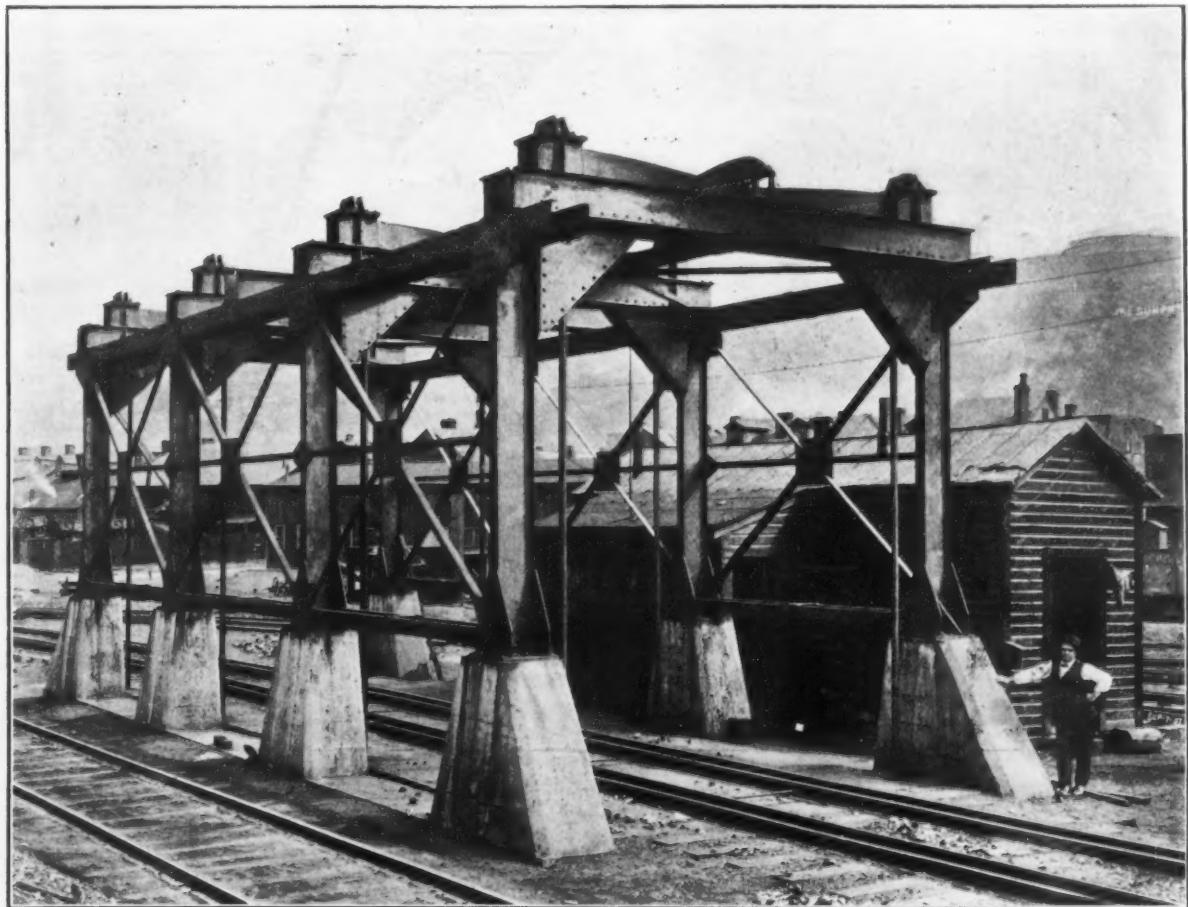
Note was made in these columns a short time since that the Standard Scale & Supply Company, Pittsburgh, Pa., had furnished two 600-ton track scales to the Jones & Laughlin Steel Company of the same city. The enormous capacity of these scales makes a description of them desirable. An illustration of one is herewith given and its special features are as follows:

The selection of suitable material fell upon a combination of steel and concrete, dispensing with all wood, as far as possible, to an extent that only the floor is of that material, to enable the rails to be spiked in the usual manner. There are four rails leading up to and

jections as to room or cost are advanced, it is well to install them.

An investigation of steel structures of similar character developed the fact that all bridges and trestles are impaired at the surface or floor line from the action of moisture from soil and rain. This weakness is well overcome by concrete piers under the main columns as a part of the retaining side walls. It is perhaps possible to carry this idea of substituting concrete for steel columns still further than 5 ft. above the road level. Train men, however, object to obstructions of view in greater dimensions and for this reason alone this compromise was reached.

The superstructure combines the plainest elements for the purpose and has met, for this reason, the approval of its inspectors and purchasers. Many of the former ornamental peculiarities in such structures are eliminated, not alone in the structure, but also in the scale



The Standard Track Scale.—One of the Two 600-Ton Steel Frame Suspension Scales Built by the Standard Scale & Supply Company, Pittsburgh, Pa., for the Jones & Laughlin Steel Company.

from the scale, two of which are continuous and form an independent track for the passage of trains not to be weighed. These continuous rails are commonly known as dead track, because no pressure is exerted upon the scale when a train passes, so saving the scale proper, which with a single track would, in many locations and under the same conditions, be rapidly destroyed. As the scale has different functions to perform, it is reasonable to let its members only do the share allotted to it and not act as a highway. This is fully attained by the use of the dead rail. The other two rails lead the train to be weighed upon a free swinging, suspended platform, which, therefore, has rails cut square at the ends, meeting the connecting rails with $\frac{1}{2}$ in. clearance between them. Both these tracks separate from the main track before they reach the scale, and, after leaving the platform, unite at about the same distance as they parted from the main track, requiring, therefore, a switch at each of these points. It has been found that for a service of 30 cars per day, no dead rail arrangement is necessary, but above this number, when no other ob-

proper, which is suspended from pins above and between the lateral cross beams. There are in all, for a 46-ft. platform, 8 vertical rods, making connection between the scale levers above and the platform below. The clearance between these rods laterally and height is that of standard tunnel dimensions. All the structural steel used in building the two scales for the Jones & Laughlin Steel Company was rolled and fabricated in that company's own plant, the scales and design being furnished by the Standard Scale & Supply Company.

The Standard Scale & Supply Company states that a close observation of the weekly test reports shows the superiority of suspension railroad track scales over the antiquated pit scales; the obtained weigh results are more accurate and give no room for disputes. The longevity of this type over the other is already established and is due to the indirect action of the load on the scale and the removal of the cause which destroys the delicate edges upon which the accuracy depends, by rust and wear. In the light of these advantages, the greater cost of installation becomes justified.

The Grant-Lees Automatic Gear Cutter.

Spur and spiral gears, it is claimed, have never before, in this country at least, been cut on machines of other than the rotary, reciprocating feeding, intermittent indexing type. The first time that the hobbing method was successfully applied in cutting such gears is stated to have been on a machine brought out by John J. Grant in 1900, which was primarily intended for cutting worm gears. Some 18 years ago George B. Grant obtained a patent on a machine having the principle of cutting gears with a hob, but no commercial results ever appeared from this, and the machine here illustrated is believed to be the first of its kind manufactured in the United States and offered on the market. It is the result of the combined effort of Earnest J. Lees and John J. Grant and is built by the Grant-Lees Machine Company, Cleveland, Ohio. As illustrated in Fig. 1, which shows front and rear views and brings out the stiffness and rigidity of the machine, it bears a striking resemblance to a Lincoln

Under ordinary conditions 2 hp. is sufficient to drive the machine, but it naturally takes more power to cut large teeth with high speed cutters. The drive is transmitted to the cutter from the cone pulley shaft through a pinion and spur gear to the main spindle, and the latter carries a bevel pinion meshing with an idler bevel gear, which meshes also with a bevel pinion on the swiveling arbor supporting the cutter. By this arrangement the cutter may be set and driven at any angle, as may be seen in Fig. 6. For spur gears the angle is the same as the lead of the thread of the cutter. The rotation of the work arbor is effected from another pinion on the cone pulley shaft through a set of change gears, on the side of the machine, thence to a worm shaft and worm wheel which drives the blanks. The vertical feed of the work arbor is taken from the front end of the worm shaft, which imparts the rotation, and is adjusted to suitable amount by change gears. The last change gear is on a shaft, with a worm engaging a worm wheel on an elevating screw which raises the spindle carrying the

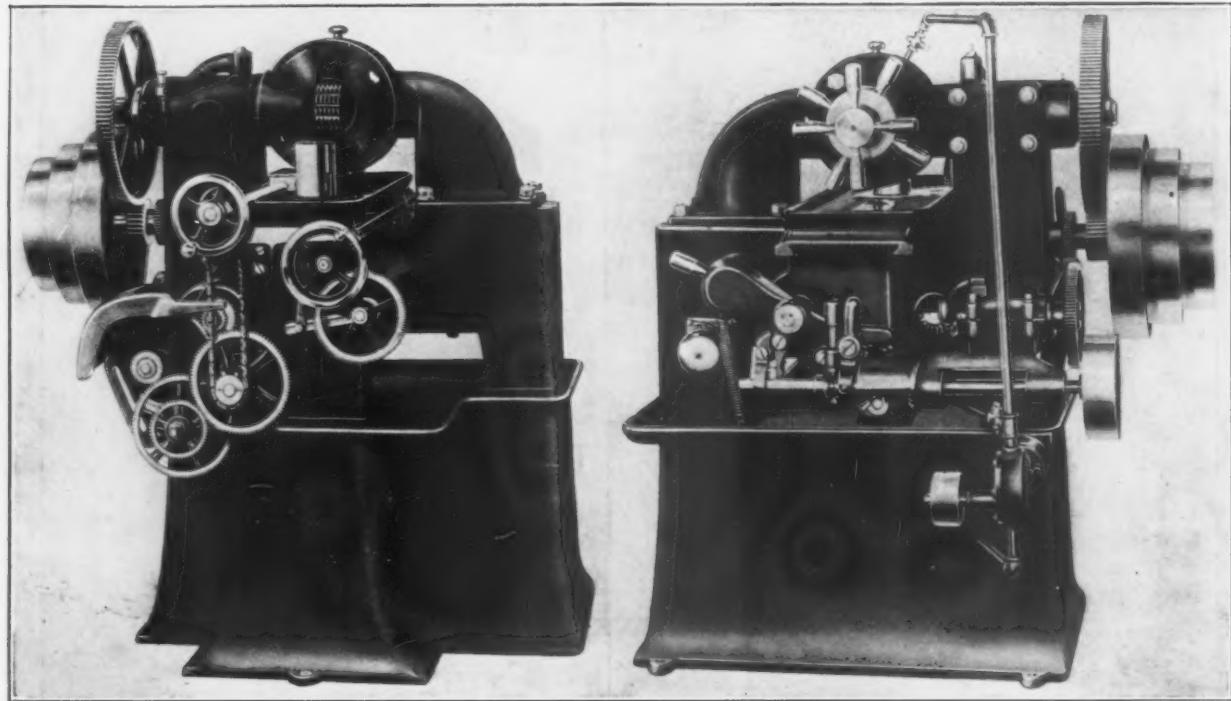


Fig. 1.—Front and Rear Views of the Automatic Gear Cutter Built by the Grant-Lees Machine Company, Cleveland, Ohio.

type miller. Another feature disclosed by the engraving is the absence of overhang in the cutter head.

The gear cutter is designed to cut automatically with a hob, spur gears, worm gears, spiral gears, helical gears and sprockets up to 20 in. outside diameter, and requires only a slight adjustment for each gear. Spur and spiral gears may be cut up to four pitch and worm gears any pitch up to $\frac{3}{4}$ in. The company manufactures hobs of any pitch, both circular and diametral, up to 15-in. lead. By using a special hob, sprockets can be cut on the machine in the same manner as spur gears are cut. A boy, it is claimed, can handle three or four machines at a time. Blanks prepared for this gear cutter need not be accurately machined to finished diameter; in fact, it is preferable to leave them 1-32 in. full, allowing the base of the hob groove to cut the gear to the exact diameter, which is automatically determined by a micrometer stop.

The work is mounted on a hardened and ground tool steel arbor inserted in a vertical spindle, which continuously revolves and feeds vertically during the cutting operation. The spindle has a horizontal movement as well, controlled by a hand wheel at the front providing micrometer adjustment for diameter of gear and depth of tooth. The cutter drive and the rotating and vertical feeding of the blank are all obtained from the cone pulley shaft. This is an important advantage, particularly in cutting spiral gears, as the movements must be in harmony with each other to generate the correct angle.

blanks. The cone pulley gives cutting speeds of 29, 52 and 84 ft. per minute. The vertical feeds are 1-16, 1-32 and 1-64 in. per revolution of the blanks.

The rear view of the machine, the one at the right in Fig. 1, shows the mechanism of the power automatic quick return, which is driven from the pulley below the main driving cone pulley. The quick return is controlled by a system of clutches operated by cams at the rear of the machine, which are fastened to a rack having a movement equal to the travel of the blank. These cams automatically throw out the feed when the cut is completed and throw in the quick return, and when the blank is down to its original position the trip lever rings a bell and throws out the quick return movement.

In cutting spur gears the blank, or stack of blanks, revolving at the proper ratio, is automatically fed vertically through the teeth of the hob, and the gears are cut in one continuous operation, as will be understood from Fig. 2. When the gears are cut the quick return automatically brings them to their original position, and a gong summons the operator to refill the machine. A gear, or a stack of gears, up to 6 in. face may be accommodated on the arbor. For cutting involute spur gears a hob cutter having teeth of the same profile as those of a corresponding rack is particularly adapted. There are several advantages in generating teeth this way. Only one cutter is needed for each pitch, cutting all gears from the lowest to the largest number of teeth. Since all gears of a

given pitch are cut by one correct hob, the errors are eliminated which attend the use of the ordinary milling cutters having the tooth curves only approximated except for a given number of teeth. As the work is continuously rotated while being cut, the heat is uniformly distributed.

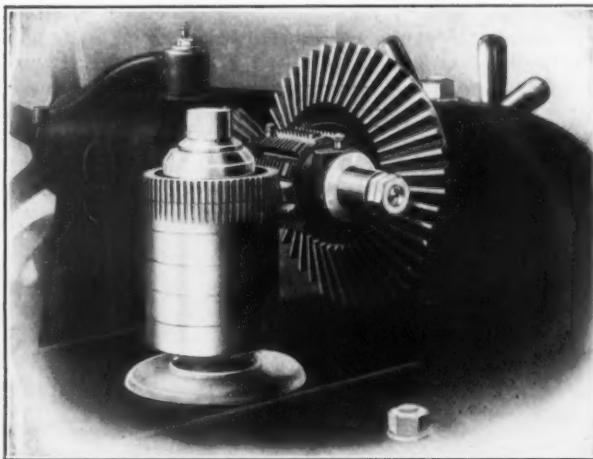


Fig. 2.—Cutting a Stack of Spur Gears.

machine, controlling the horizontal movement of the spindle, and shown in Fig. 1, is in action when hobbing worm wheels.

Fig. 5 illustrates the means employed for holding and rotating a narrow faced gear having a small bore.

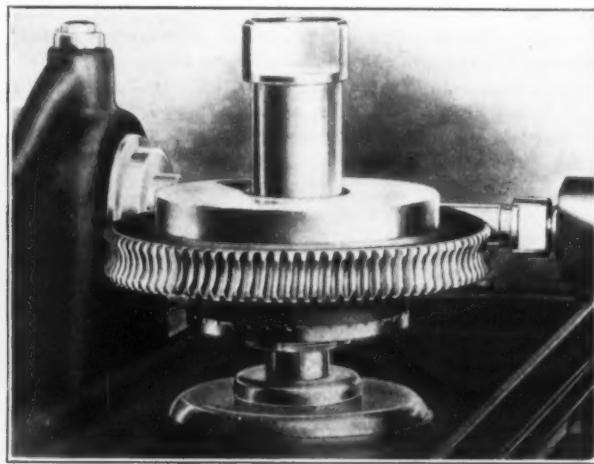


Fig. 4.—Cutting a Worm Gear.

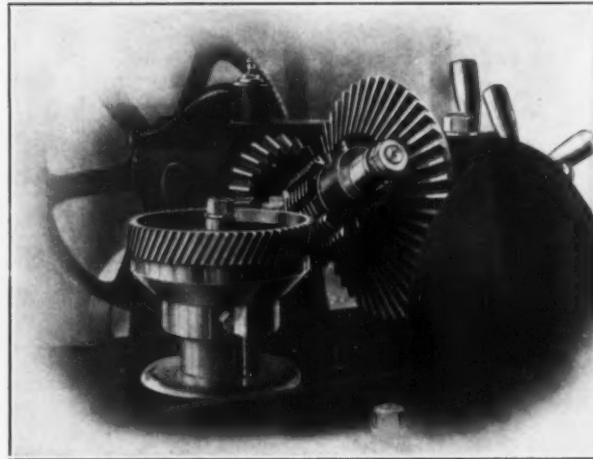


Fig. 3.—Cutting an Ordinary Spiral Gear.

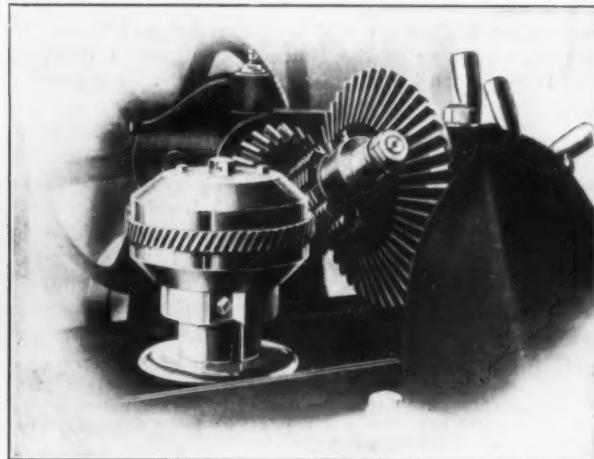


Fig. 5.—Cutting a Thin Spiral Gear of Small Bore.

TYPICAL OPERATIONS POSSIBLE ON THE GRANT-LEES GEAR CUTTER.

and the hob, which passes between and over all the teeth several times, insures absolutely uniform teeth, because the cutter and blank are geared together at a given ratio by the change gears on the cone side of the machine. The proper change gears are selected by referring to a chart which indicates what gears to use for any given number of teeth.

Fig. 3 shows the machine cutting spiral gears. The same cutter for the normal pitch of the spiral is used as in cutting spur gears of the same pitch, but in this case the change gears at the front of the machine are set in conjunction with the rotating gears on the cone side of the machine to give the correct angle of the spiral. For spiral gears the hob is set at the angle desired and the blanks are rotated to give the necessary increase or decrease in relative speed per revolution to generate the correct angle. No indexing is required and the process is continuous, as in cutting spur gears. It is claimed that a spiral gear can be cut on this machine in one-fifth of the time ordinarily required. The special hob used for all spur and spiral gears of the same pitch costs less than an equivalent set of involute milling cutters.

The operation in cutting worm gears, illustrated in Fig. 4, is the same as on the original worm gear hobbing machines now universally used for this class of work. The hob is set horizontally and the worm gear blank revolves automatically and feeds horizontally into the hob until the proper center distance is obtained. No previous nicking of the blank is required. The ratchet feed associated with the hand wheel at the front of the

arbor is used only to center the blank and the drive is from the support rigidly attached to the spindle. An automatic steady rest to prevent springing of gears of large diameter is to be seen in Fig. 6. By this mechanism

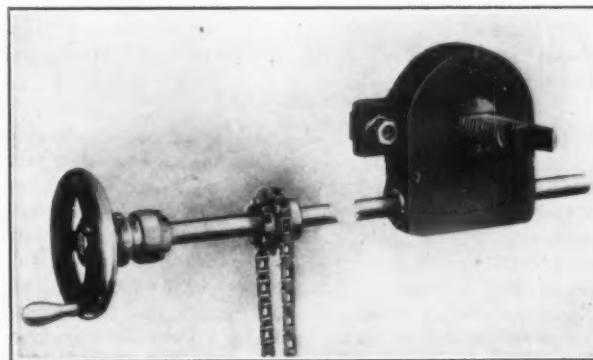


Fig. 6.—An Automatic Steady Rest for Preventing Large Gears from Springing While Being Cut.

the rest takes the thrust immediately under the cut and moves in unison with the main spindle.

The machine is automatic to the extent that work is fed through the cutter, stopped, returned to the original position, stopped and a gong sounded to announce the completion of the work. It is guaranteed by the makers that because of the rigidity of the machine and its con-

tinuous cutting action it is able to produce at least 20 per cent. more work in given time than any other machine for the same purpose. The weight of the machine complete is about 2600 lb., and the floor space occupied 4 x 5 ft. The complete equipment includes a full set of change gears, wrenches and a countershaft. An oil pump may be furnished as an extra.

Agents for the Grant-Lees gear cutting machines are: Manning, Maxwell & Moore, New York, Philadelphia, Chicago, Pittsburgh, Cleveland, Detroit, Milwaukee, St. Louis and Birmingham; Hill, Clarke & Co., Boston, and Harron, Rickard & McCone, San Francisco.

Bankers Favor Credit Currency.

The American Bankers' Association in convention at Atlantic City, N. J., September 26, indorsed the report of its special commission of last year in favor of currency reform. The convention not only accepted the report, but indorsed its recommendations, continued the commission and authorized it to continue the fight for legislation by Congress. This action was of special significance, because it is the result of discussions, running through the annual meetings of the association for many years, which have finally culminated in a complete victory for the supporters of a credit currency and progressive legislation by Congress. This result was achieved only after a fight in which Congressman Charles N. Fowler, chairman of the House Committee on Banking and Currency, led the credit forces against the opposition.

A. Barton Hepburn, president of the Chase National Bank and chairman of the Currency Commission, presented the report which was discussed at meetings in Washington last winter. The report itself was a comprehensive review of money conditions the world over as these bear upon finance in this country, and with these conditions, as well as national prejudices in mind, the commission made recommendations for a currency plan which Mr. Hepburn stated in part as follows:

1. Any national bank having been actively doing business for one year, and having a surplus fund equal to 20 per cent. of its capital, shall have authority to issue credit notes as follows, subject to the rules and regulations to be determined by the Controller of the Currency:

(a) An amount equal to 40 per cent. of its bond-secured circulation, subject to a tax at the rate of 2½ per cent. per annum upon the average amount outstanding.

(b) A further amount equal to 12½ per cent. of its capital, subject to a tax at the rate of 5 per cent. per annum upon the average amount outstanding in excess of the amount first mentioned.

2. The same reserves shall be carried against credit notes as are now required by law to be carried against deposits.

It provides a 5 per cent. guarantee fund, from which to redeem the notes of any defaulting bank; it provides numerous redemption cities conveniently located in various parts of the country.

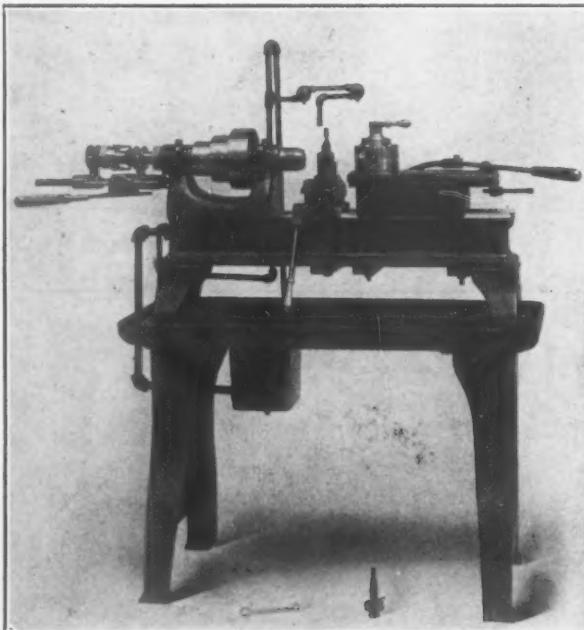
It is estimated that the adoption of such a plan would add at least \$300,000,000 to the circulating medium.

Industrial Education.—The American Society of Mechanical Engineers will hold its first monthly meeting this fall on the evening of October 8 in the main auditorium of the Engineering Societies Building at 29 West Thirty-ninth street, New York. The subject of the meeting will be industrial education. The college technical courses and the student apprenticeship courses will be discussed at length by men who have been in charge of theoretical and practical institutions. Prof. John Price Jackson has written a paper in which he gives data from several of the largest manufacturing establishments in America regarding the courses offered by the factories. Dr. Henry S. Pritchett, president of the Carnegie Foundation and president of the Society for the Promotion of Industrial Education, and Prof. Dugald C. Jackson of Massachusetts Institute of Technology and president of the Society for Promotion of Engineering Education, will deliver short addresses on the subjects allied to their societies. Other manufacturers have been invited to speak informally of their experiences.

The Wells Hand Screw Machine.

Among other new machines recently brought out by the F. E. Wells & Son Company, Greenfield, Mass., is the hand screw machine shown herewith. It is claimed to be capable of doing quicker and better much of the small work usually done on a more expensive machine. Options in the equipment are either a four or a six-hole automatic turret, or a four-hole hand turret, and wire feed or plain hand feed. Only one of the sizes built is illustrated; this one admits a $\frac{3}{8}$ -in rod when provided with wire feed.

The wire feed mechanism is a special feature differing from the customary weight and chain arrangement. Inside the plunger that opens and closes the automatic



A Hand Screw Machine Built by the F. E. Wells & Son Company, Greenfield, Mass.

chuck is an extra tube and collet which feeds the bar until it is all used up. This is practically the same device as employed on automatic machines. When desired the inside tube and collet can be taken out and the machine used with the automatic chuck with hand feed, in which condition the capacity through the chuck is $\frac{3}{8}$ -in. For holding larger work, such as castings, forgings, &c., the cap on the spindle can be removed and any chuck up to 8 in. diameter can be screwed on the spindle.

The maximum swing over the bed is 11 in. and the greatest length that can be machined is $4\frac{1}{2}$ in. The holes in the turret are 1 in. in diameter. The length of the bed is $3\frac{1}{2}$ ft. and the net weight 675 lb. The equipment includes an automatic chuck, a collet for $\frac{1}{2}$ -in. wire, turret, cross carriage, oil pump and piping and a friction countershaft. It will be observed from the engraving that the headstock is in one piece with the bed; this gives greater stiffness and is typical of the strong construction throughout to provide for the use of high speed tools.

A scheme is on foot to establish a sheet steel plant at Hazelton, Pa., for which a site has been offered and a good sum of money subscribed. E. Cooper Shapley, Stephen Girard Building, Philadelphia, Pa., is attorney for those interested, and L. C. Taylor of Cambridge, Ohio, is said to be one of the stockholders. It is understood that the Schlieper Engineering Company, Pittsburgh, Pa., is also interested in the project.

The American Iron & Steel Mfg. Company announces that its branch office at San Francisco, Cal., is now located on the third floor of the Crocker Building, on the corner of Market, Post and Montgomery streets. Hugh P. Stuart is the local sales agent.

Two Lodge & Shipley Lathe Attachments.

A deep drilling attachment and a roller follow rest, designed by the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, and adapted to use on its lathes, are illustrated in Figs. 1 and 2, respectively. The first is individually motor-driven and performs the function of drilling deep holes rapidly in work mounted in an engine lathe; the second is a refined design of follow rest em-

minutes time is all that is required to change over to engine lathe work.

The Roller Follow Rest.

The tendency of a bar carried on centers, to spring from the tool under heavy cuts, makes the follow rest an attachment of great importance. High speed and coarse feed are destructive of the solid jaws of the familiar type of follow rest. The jaws are rapidly worn away and the rubbing friction is a source of considerable lost power. Fig. 2 shows a follow rest, entirely new in principle and of value in the saving of time, as

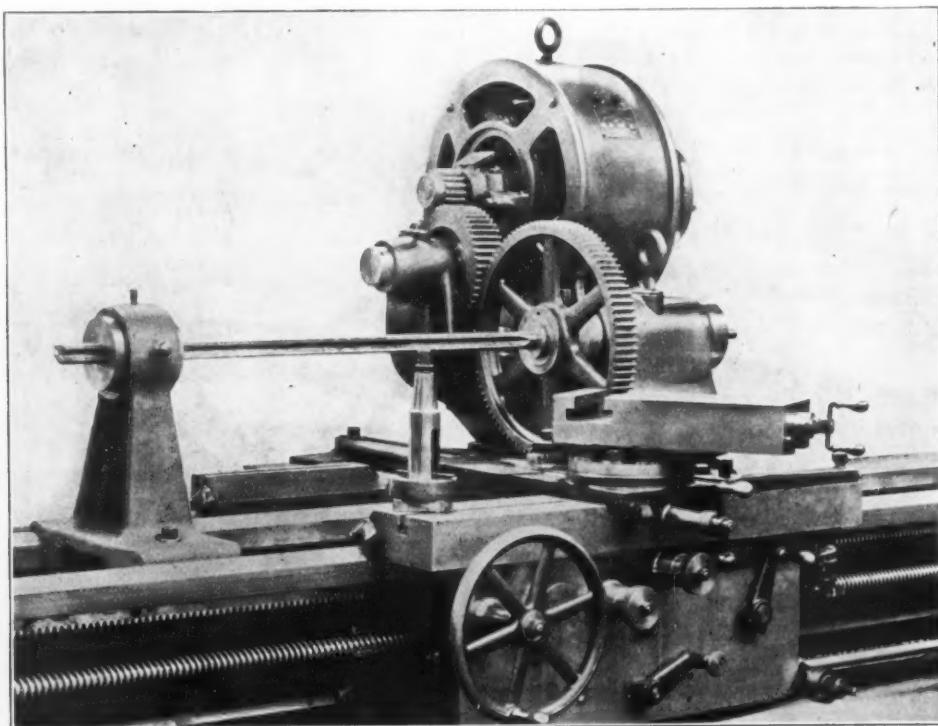


Fig. 1.—A Motor Driven Deep Drilling Lathe Attachment Made by the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio.

bodying features for which need has arisen since the introduction of high speed steels capable of taking very heavy cuts.

The Deep Drilling Attachment.

This attachment is mounted upon the lathe carriage by bolting the bed plate to the wings or arms of the carriage. The bed plate is in one piece with the drill spindle bearing and the bracket upon which the motor is mounted. A 3-hp., 2 to 1, variable-speed motor provides the drive, which is transmitted from the motor pinion through a rawhide intermediate gear to the large driving gear keyed to the drill spindle. The spindle is bored to admit lubricant to the drill, has a large bearing and is ring oiled. The drill shank bushed, fits into the hole in the spindle. The outer end of the drill is carried in a free bush that revolves in a support bolted to the lathe bed.

The drill used is of special construction known as the Chard deep drill. A flat bit of high speed steel is held in position by a taper pin and is ground so as to break up the chips and so facilitate their removal. Lubricant under pressure sufficient to clear the chips and cool the cutting edge, is supplied by a pump attached to the lathe at the rear of the headstock and driven from the lathe countershaft. Flexible tubing connects the pump with the hollow spindle, being attached to a nipple at the rear end of the spindle. Two copper tubes flush with the surface of the drill, carry the lubricant to the drill point. This type of drill has been in use for some time in boring lathe spindles, back gear sleeves and pulley sleeves. Under most favorable conditions a 2-in. drill has been advanced at the rate of $2\frac{1}{4}$ in. per minute. The drill shown in the engraving is 1 in. in diameter and is used in boring holes 44 in. deep in locomotive driving axles.

The whole attachment may be easily removed from the carriage by means of an overhead crane; a few

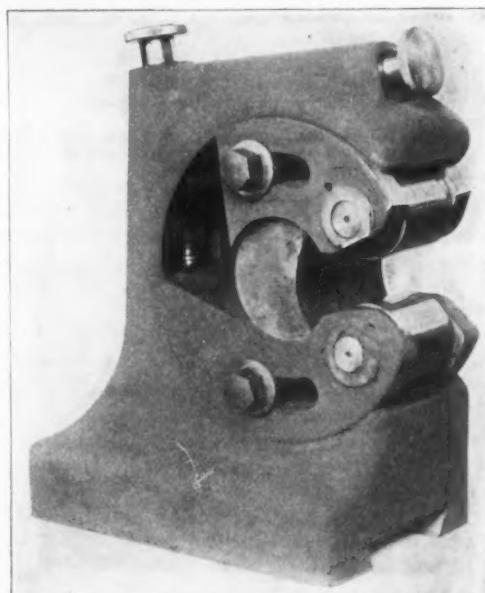


Fig. 2.—The Lodge & Shipley Roller Follow Rest.

well as insuring greater accuracy. It is mounted upon the bridge of the carriage.

The two jaws, moved by a worm and knob, and carrying steel rollers, move in and out on a circular path and give, with the cutting tool, three points of contact. The rollers once set, are adapted for a variety of diameters by simply moving the entire rest backward or forward on the bridge dovetail. This is accomplished by connecting the rest to a screw which telescopes through the regular cross feed screw and is operated by

the hand wheel controlling the tool rest. The position of the rollers is such that, when approaching a shoulder, they support the shaft upon the smaller diameter until the cutting tool has turned a portion of the larger diameter, when the rollers may be quickly brought to bear. The rollers are of hardened tool steel and have ample provision for oiling. Sensitive adjustment is made without the aid of a wrench and the jaws when set can be locked in position.

The One-Lock Adjustable Reamer.

The turning of a slot headed cam bolt and the tightening of a single nut adjusts the One-Lock adjustable reamer shown in Fig. 1, hence its name. It is made by the Wm. J. Smith Company, New Haven, Conn., and is of a new and remarkably simple construction. With the exception

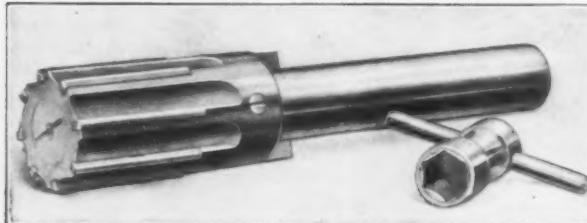


Fig. 1.—The One-Lock Adjustable Reamer, Assembled.

A $\frac{3}{4}$ -in. reamer has a range of adjustment of 1-32 in., and the range increases in larger reamers up to $\frac{1}{8}$ in. for those of $4\frac{3}{4}$ to 6 3-16 in. diameter. In all sizes of reamers of the same length the blades are of the same thickness; it is therefore possible to use a single size of blades in more than one shell, and when one set have been ground down to their limit for a given size shell they

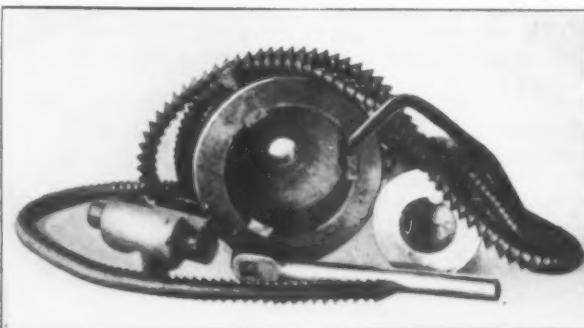


Fig. 3.—Parts Used in Boring the Front End of the Reamer Shells.

may be transferred to the next smaller size having the same length of blades. A large amount of metal is available for regrinding the blades. It is a feature peculiar to this cam bolt system of adjustment that sharpening and

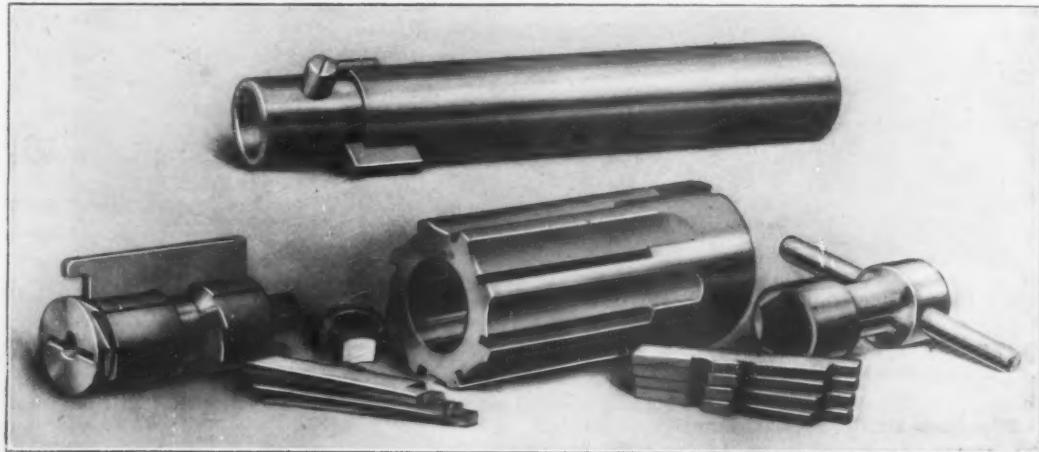


Fig. 2.—Parts of the One Lock Adjustable Reamer Made by the Wm. J. Smith Company, New Haven, Conn.

of the blades there are only three parts, the shell, the cam bolt and the lock nut. The shell or body is bored and slotted to receive the cam bolt and blades, and the latter each rest on a cam surface on the cam bolt, as shown at the left in Fig. 2. To engage and lock all the blades simultaneously in adjusted position, the cam bolt has a groove undercut at the forward side. The groove is correspondingly chamfered at the rear side and the blades have lugs of a profile conforming to the section of the groove. When the blades are inserted in the shell with their lugs fitting the cam bolt groove and the lock nut is tightened, the blades are secured in position by being clamped between the undercut side of the groove in the cam bolt and the square end seats of the blade slots in the shell. This clamping also holds the blades solidly against the cam surfaces of the bolt. The blades are firmly supported laterally by the slotted shell. Back of the cutting edges the slot sides are higher to reinforce the part subject to the greatest working strain.

Adjusting the reamer involves loosening the lock nut with the special hexagon socket wrench provided, and turning the cam bolt with an adjusting key (not shown in the engraving) inserted in the slotted head. A zero mark on the cam bolt indicates the adjustment by reference to graduations on the end of the reamer shell. Turning the cam bolt produces only in and out movement of the blades perpendicularly to the axis of the reamer; their longitudinal position remains relatively fixed, and the blades project enough beyond the front end to ream to the bottom of a hole.

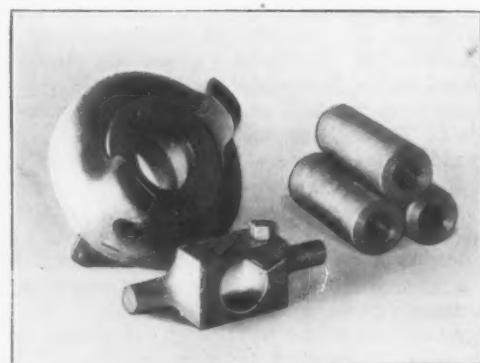


Fig. 4.—Parts Used in Boring the Reverse End of the Shells.

adjusting the blades to size are accomplished independently.

As originally supplied, the blades of these reamers are ground with radial clearance from the cutting edge by the use of special blade grinding jigs. Fourteen of these jigs cover the range of reamer sizes, and may be furnished, if desired, for the user to grind his own blades, or they may be ground in any other convenient way. A uniform amount of radial clearance is provided in all sizes, about $1\frac{1}{2}$ degrees from a full diameter circle. From tests in reaming a number of different metals it was found that

this amount of clearance gave the smoothest and most accurate work in general use.

Since the adjusting parts are entirely contained within the shell, they are protected from chips and dirt and from injury by careless handling. The exterior of the reamer is smooth and symmetrical, and the deep fluting of the shell affords plenty of room for chips, preventing the

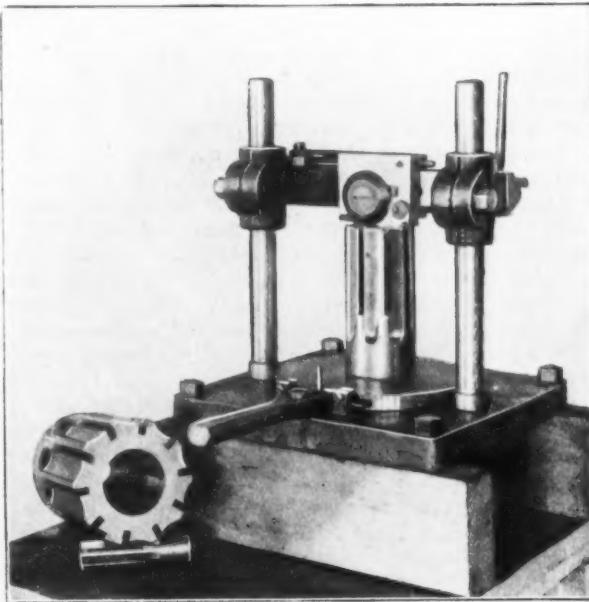


Fig. 5.—The Device for Marking the Graduations on the End of Reamer Shells.

reamer from clogging. An advantage in the shop use of the reamer is that the adjustment cannot be changed without the socket wrench; if this is kept in the toolroom the workmen cannot alter the size of the reamer at their pleasure. Perfect alignment of the reamer is insured by making it a floating fit on the arbor, to which it is held by

encircling the parts was made with this tool and gives some idea of its ability to cut rapidly. A bored reamer shell is shown at the right of the chuck used to hold it while being bored. For boring the reverse end, the second operation on the reamer shell, a carrier for the turret lathe spindle is used, shown in Fig. 4. In front of this is the dog for clamping the pieces, which are shown at the right. They are mounted on an arbor fastened to the end of the turret lathe spindle, and the shells are so supported that there are no unequal strains which might cause cramping and impair the alignment of the holes.

A special device for graduating the ends of reamer



Fig. 7.—Milling the Clamping Side of a Reamer Blade Lug.

shells is shown in Fig. 5. The shells are mounted on a taper drawing pin and bushing, which clamp the shell to the index plate of the graduating device. This index plate is revolved by a ratchet and pawl, which accurately spaces the graduations. On the top of the frame is a cross head slide carrying the scribing tool for making the division marks after each advance of the index plate. Movable stops limit the travel of this head and vary in position with each cut, to regulate the length of the graduation marks.

The cams on the bolts are milled after the manner indicated in Fig. 6, the bolts being held between index centers in a milling machine as shown. The milling machine illustrated in Fig. 7 is set up for cutting the clamp-

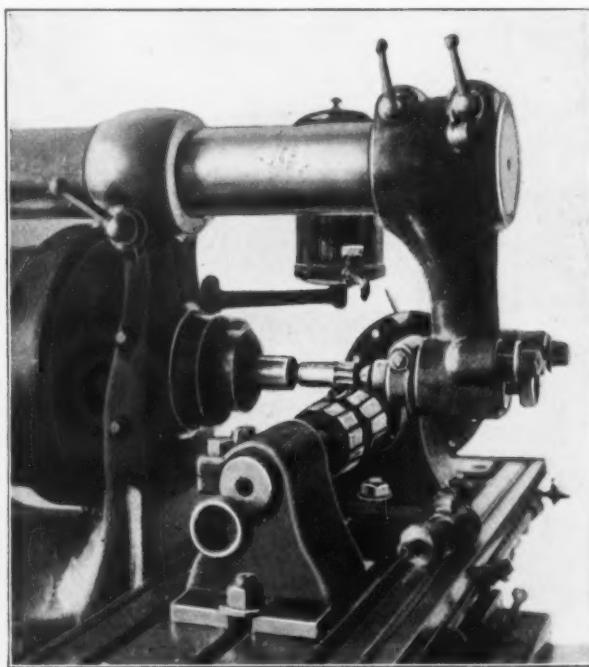


Fig. 6.—Milling the Cam Surfaces on a Reamer Cam Bolt.

a retaining screw, and a hardened steel driving key in the arbor engages the slotted back end of the reamer shell. At this end the reamer is left of full diameter size to give the strongest possible driving contact.

The other illustrations herewith show steps in the process of manufacturing the reamers. Fig. 3 illustrates the parts used in the first operation, boring the reamer shell. On the left is the boring tool, which is fitted with detachable high speed steel cutting blades. The chip

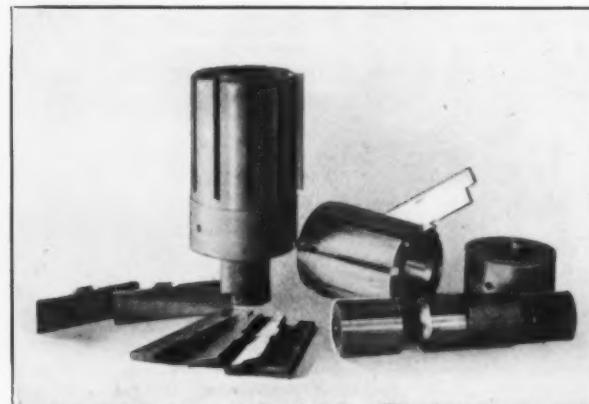


Fig. 8.—An Assembled and an Unassembled Jig Used for Grinding Reamer Blades.

ing sides of the reamer blade lugs. It will be seen that a special form of cutter is used having the same cross sectional form as the undercut side of the cam bolt.

Reference was made before to the jigs employed when grinding the radial clearance on reamer blades. One of these is shown in Fig. 8. The slots in the jig, unlike

those in the reamer shell, are inclined instead of being radial. The inclination is such that when the exposed edges of the blades are ground as a cylinder they will have the desired clearance when transferred to the reamer shell. The part of the Jig which takes the place of

range is covered with two sets of blades. The maker carries a complete stock of interchangeable blades of both carbon and high speed steel, fitted and ground ready for immediate use, and also resharpenes blades for those who prefer not to do the work for themselves.

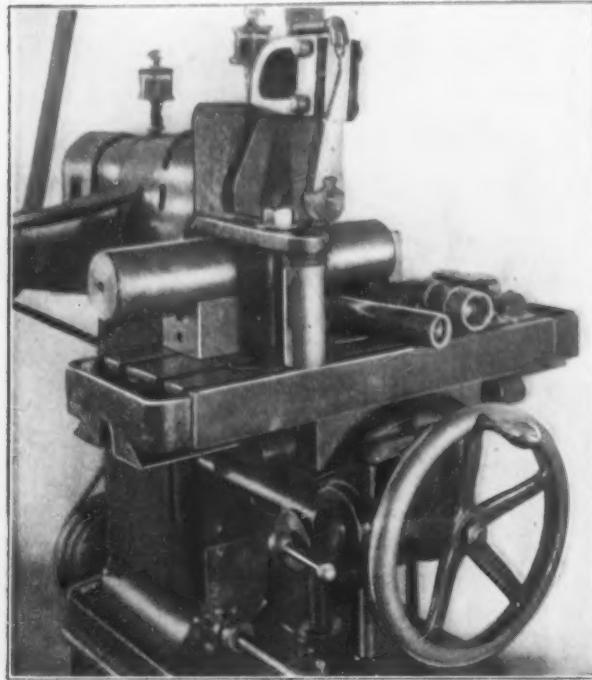


Fig. 9.—An Oscillating Milling Machine Used for Cutting the Slots in Reamer Shells and the Sockets in the Hexagon Wrenches.

the cam bolt in the reamer shell is cylindrical where the bolt has cam surfaces. Fig. 9 shows an oscillating milling machine equipped for cutting the key slots in reamer arbors. By substituting the cutter lying on the extreme

A New Whitcomb-Blaisdell Lathe.

The distinctive features of a new 20-in. double back geared engine lathe built by the Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., are shown in the illustrations. The improvements include a new quick change feed gear box of simple but effective design, providing wide range of geared feeds and screw pitches, which may be augmented by the substitution of change gears. In general design the lathe is substantial and well proportioned; the bed is of an improved box pattern, deep and stiff, and has broad top surfaces for the carriage and tailstock. Although massive and powerful, the machine presents exceptional conveniences for facility of operation.

The particularly interesting part of the feeding mechanism is the quick change gear box shown in Fig. 2. By means of the handle A, the operator can instantly obtain eight screw pitches and eight geared feeds. An index plate associated with the handle shows which feed or thread cutting combination is in action. By bringing into use the small compound gear permanently located at the head of the lathe eight more feeds and as many more screw pitches are obtained. Consequently the mechanism permits without the removal of a gear the obtaining of 16 different geared feeds, which, for example, may be 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 72, 88, 104 and 120 per inch, and 16 different screw pitches, which, with the setting of the feed as above, would be 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 18, 22, 26 and 30 per inch. Three extra change gears are provided, one solely for cutting 11½ threads to the inch, and the other two to increase the feed range from 8 to 240 per inch, and the screw pitch range from 2 to 60.

From the illustration it may be seen that the gear

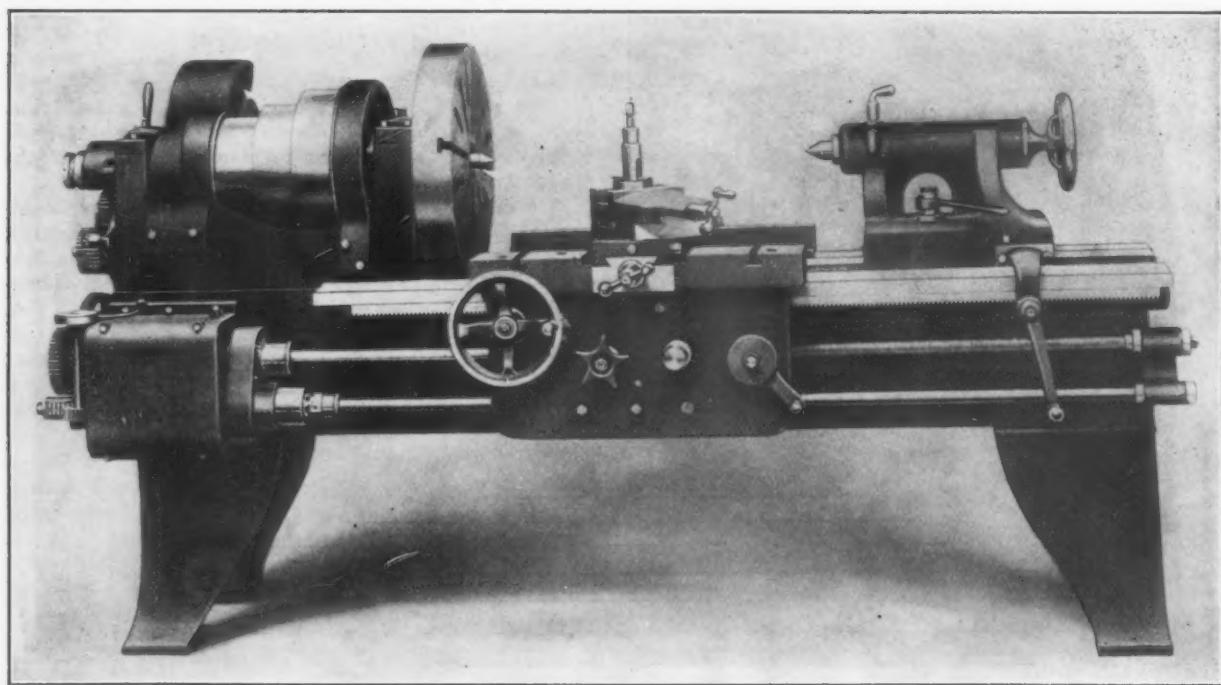


Fig. 1.—The new 20-In. Engine Lathe Built by the Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass.

right end of the milling machine table, the holes in the hexagon socket wrenches for locking the cam bolts of reamers may be milled at one setting.

The One-Lock adjustable reamers are made in 88 sizes, from $\frac{3}{16}$ to 6 3-16 in., inclusive, varying by sixteenths. Each reamer, when adjusted to maximum size, will reach the minimum size of the next larger reamer, except reamers of $\frac{3}{16}$ to 1 3-16 in. diameter, inclusive, in which the

box is of very simple design. Within the cast iron case are two shafts each carrying eight gears. The gears on the upper shaft are in two cones of four each, geared together so that the second cone runs much slower than the first. The eight gears mesh with reciprocal gears loosely mounted on the lower shaft, but capable of being individually connected with it by driving keys. The arrangement is such that the loose gears are engaged pro-

gressively according to the speed obtained, and any one of the eight pairs of gears may be thus made active. The lower shaft is in line with the feed rod of the lathe, to which it may be connected by a sliding clutch, and it also carries a gear into which a sliding gear on the lead screw

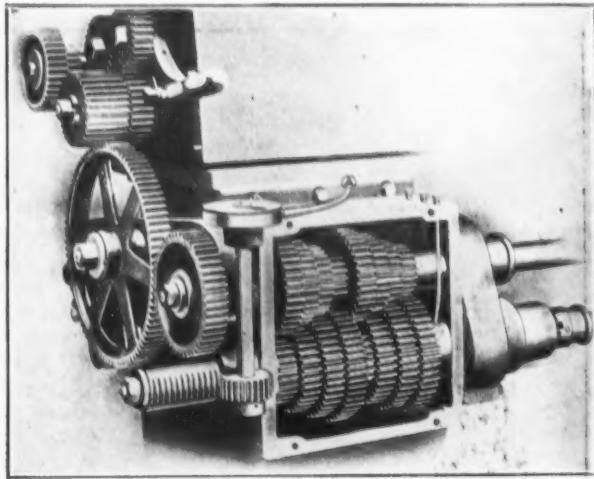


Fig. 2.—The Feed Gears Exposed.

may be meshed, so that the motion from the feed box may be transmitted to either the feed rod or screw. The handle, by means of which the gear box is operated, is on a vertical shaft with a segment pinion engaging rack

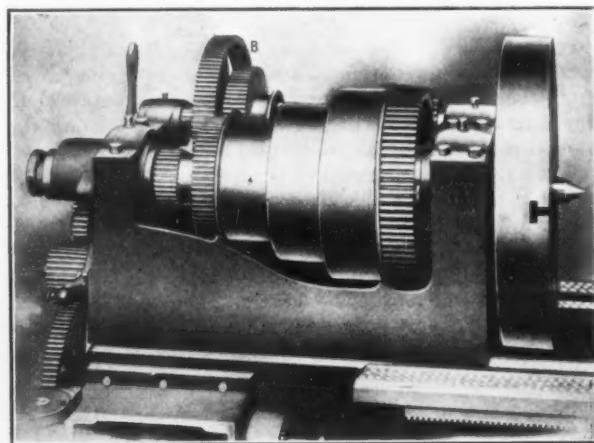


Fig. 3.—The Headstock with Gear Guards Removed.

teeth cut in a loose sleeve, and the latter produces the endwise shifting of the drive keys.

The headstock of the lathe with gear guards removed is shown in Fig. 3. As in other sizes of Whitcomb-Blaisdell lathes, a three-step cone pulley of large diameters

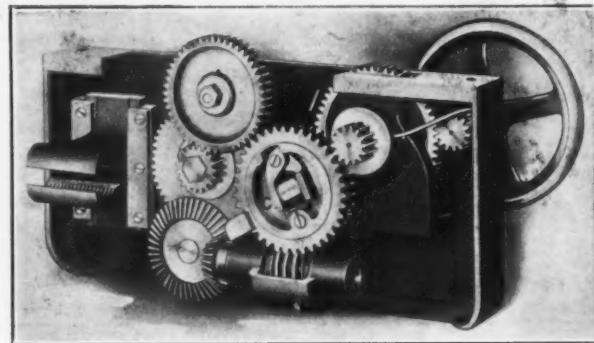


Fig. 4.—An Inside View of the Apron.

and wide faces is used, taking a $3\frac{1}{4}$ -in. belt, and this in conjunction with double back gears gives nine changes of speed. The back gear ratios are 3.5 to 1 and 11.96 to 1, and with a countershaft speed of 125 rev. per min., the spindle speeds are 189, 125, 82.5, 54, 35.7, 23.48, 15.8, 10.47 and 6.9 rev. per min. At the various speeds the effective power developed is more nearly uniform than when a

cone pulley of more steps is used. The smallest step of the cone is of sufficient diameter to give ample belt contact and speed. The back gears are engaged in the usual way by revolving the eccentric spindle on which they are loosely mounted, and one or the other train is made active by shifting the double gear B to the right or left. The countershaft speed is based on a 35-ft. per minute cutting speed on a 20-in. diameter. The spindles are of high carbon crucible steel with large bearing surfaces in bronze boxes.

Fig. 4 shows the feed works in the apron of the lathe, which are particularly designed for strength and durability. The gears are of coarse pitch and wide face and are rigidly supported upon the apron. The friction ring clutch C for engaging the feed is simple but powerful, on account of the large diameter of the expanding ring. A new feature is the means for regulating the friction for light or heavy work; the adjustment is made from the outside of the apron by turning a small exposed nut. The latter is on the outer end of the spindle carrying the actuating cam, and is recessed in the operating knob. A spring holds the spindle inward as far as the nut will permit, and the cam is beveled axially to conform with beveled surfaces on the ring expanding levers. The farther the cam enters between the levers the greater the pressure exerted in expanding the ring, and hence the stronger the grip. The action of the friction is plainly indicated in the engraving, as is also the substantial means of holding the parts of the split nut for engaging the thread cutting screw.

With the lathe are furnished a friction countershaft, large and small face plates and the necessary wrenches. The actual maximum swing of the lathe over the bed is $22\frac{1}{4}$ in., and over the carriage $13\frac{1}{4}$ in. A lathe with an 8-ft. bed takes 36 in. between the centers and weighs 3925 lb.

A Lead and Zinc Organization.

About 90 delegates, representing 15 lead and zinc mining camps in Wisconsin, Illinois and Iowa, assembled at Mineral Point, Wis., September 27 and organized the Tri-State Mining Association. The object of the association is the furthering of the interests of the lead and zinc industries of the Northwest, by forming an organization through which better freight rates may be obtained, labor conditions improved and the output regulated.

The meeting was one of the largest ever held of men engaged in the lead and zinc mining business in the Northwest. The new association will meet monthly in the different cities of the district, the second assembly to be held at Platteville, Wis., October 25. J. H. Lewis of Benton, Wis., was elected temporary chairman, and George Grilling of Mineral Point, temporary secretary.

A committee consisting of Floyd Bolland, Cuba City, Wis.; James Hutton, Galena, Ill.; James Kennedy, Platteville, Wis.; Thomas Hicks, Linden, Wis.; Arthur David, Montford, Wis.; J. F. Leahy, Shullsburg, Wis.; Ben Stevens, Centerville, Wis.; O. G. Rewey, Mifflin, Wis.; W. H. Schoenfeld, Dodgeville, Wis.; A. G. McDave, Dubuque, Iowa; Phillip Allen, Mineral Point, Wis.; J. H. Lewis, Benton, Wis.; Patrick Whitman, Highland, Wis.; W. H. Schaffer, Hazel Green, Wis., were appointed to complete the plans of organization. The election of permanent officers will be held at the next meeting.

The Railroads of the World.—A recent consular report quotes statistics collected in Germany showing that on January 1, 1906, the railroads of the world had a total length of 563,771 miles. This shows an increase of 13,036 over the mileage reported by the *Archiv für Eisenbahnen*, the recognized authority on world railroad statistics, or less than the average of construction for the preceding six years. Europe was credited with 192,247 miles and the United States with 215,713 miles. The entire capital invested in railroads at the beginning of 1906 is put at \$43,310,000,000, or an average for all railroads, with equipment and other properties, of \$76,850 a mile. In the United States the cost of road and equipment was estimated at \$14,563,200,000, or \$68,038 a mile, while the 22,843 miles in the United Kingdom represented a capitalization of \$305,000 a mile.

The Lippincott Engine Indicator Outfit.

An indicator outfit which combines in one instrument the means for indicating high as well as low speed engines, and also, with the regular equipment, pressures higher than have been attempted without a special outfit, has been perfected by A. C. Lippincott. It is the outcome of his nearly twenty years' experience in the indicator business, and is generally similar to his previous designs. The important differences are in the drum spring, which has no hooks, and in the piston, which

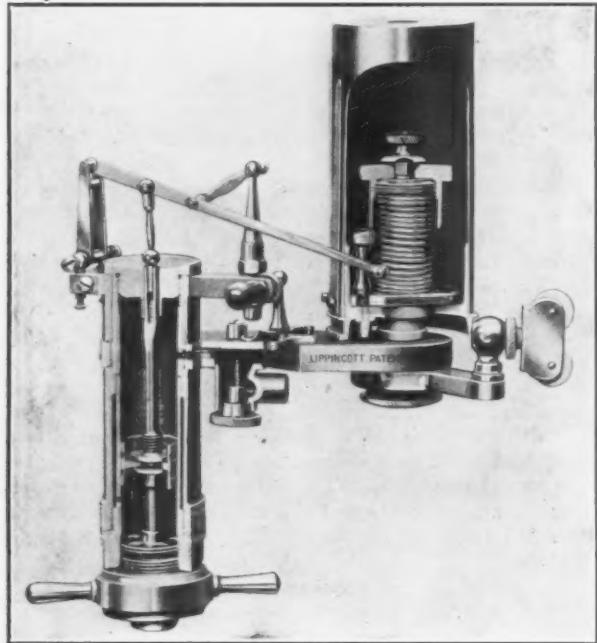


Fig. 1.—Cutaway View of the Lippincott Indicator, with Spring and Reducing Wheel Removed.

have been given the name Frictionless. Instead of bearing against the sides of the cylinder, the piston has a tail rod giving it a floating support. As may be seen in Fig. 1, the piston is carried loosely between two steel flanges, with a slight amount of lateral lost motion, so

that any side thrust, due to the spring, does not resolve itself into pressure of the piston against the cylinder. The piston is of standard $\frac{1}{2}$ -in. area, but may be quickly replaced by an extra cylinder and piston of $\frac{1}{4}$ -in. area (Fig. 2) the usual size for gas engine, hydraulic and ammonia pressure indicating. For ordnance work a piston and cylinder of 1-10-in. or 1-20-in. area can be used.

The reducing wheel, as shown in Figs. 3 and 4, is attached directly to the indicator, and is equipped with suitable bushings for

all strokes and speeds met with in practice. A recent Lippincott improvement is the cord take-up device, introduced between the wheel and the indicator. It consists of a light spring-actuated arm carrying a small grooved pulley at its outer end, around which the indicator drum cord passes, as shown in Fig. 3. As soon as the pawl of the drum detent is thrown into engagement with the ratchet teeth stopping the drum, the slack of the cord is taken up by the outward swinging of the arm, as shown in Fig. 4, preventing the cord from becoming fouled and consequently broken. With this device the drum can be started and stopped, to remove and replace cards, without disconnecting the crosshead cord.

Fig. 5 shows the cord take-up device by itself. It is

supported by the bracket H which is intended to be clamped between the reducing wheel and the indicator frame. The vertical spindle G is positioned close to the indicator drum and serves to keep the cord in proper relation to the drum when slack. The light arm I, swinging in a horizontal plane, is adjustable in length by the set

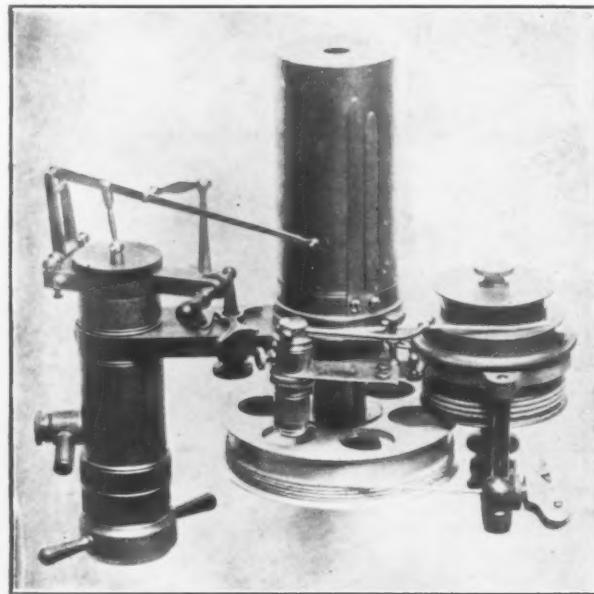


Fig. 3.—An Indicator Outfit Complete with Reducing Wheel and Cord Take-Up Device.

screw A, and is normally constrained to swing away from the spindle G, by a very elastic spring contained in the knurled sleeve F at the bottom. By loosening the thumb screw C, the sleeve F may be rotated until any desired tension of the spring is secured, when the screw is again tightened. The tension should be just sufficient to take up the slack of the cord without causing distortion of the diagram. While designed particularly for Lippincott indicators, the take-up device may be applied to any other make. The bearings are long and well fitted and the device should last indefinitely. The only part likely to give out is the spring which may be cheaply

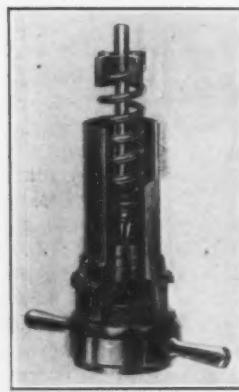


Fig. 2.—Interchangeable High Pressure Cylinder and Piston.

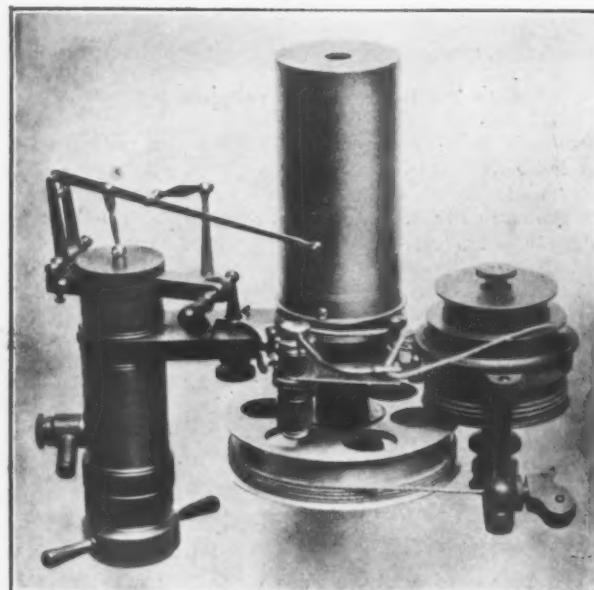


Fig. 4.—The Same Equipment When the Cord Take-Up Device Has Performed Its Function.

replaced. In case of emergency an ordinary rubber band may be used temporarily to perform the function of the spring, for which purpose the grooved pulley B is provided.

The guide pulley of the reducing wheel, as may be observed from Figs. 3 and 4, has a vertical movement effected by a lead screw, so that the turns of the cord

cannot overlap, no matter in what direction the cord is led. The wheel is made of aluminum composition and steel, and may be fitted to any make of indicator. With the indicator outfit is furnished a planimeter, reading in mean effective pressures direct for various springs, and the areas of the cards may also be read in square inches in the ordinary way.

The Lippincott indicators, reducing wheels, take-up



Fig. 5.—The Lippincott Cord Take-Up Device.

devices and planimeters are manufactured and sold by the Lippincott S. M. Company, Newark, N. J.

Organized Labor in Canada.

TORONTO, September 28, 1907.—The Trades and Labor Congress of Canada has been in annual convention recently at Winnipeg. In the report of its Executive Committee, which was adopted, the following passage in reference to labor on iron and steel contracts occurs:

It is important at this time that your attention should be called to the apparent determination of large iron and steel firms to prevent organized labor from securing protection from public contracts by the insertion of clauses in specifications calling for the "union or prevailing" rate of wages. Should these firms successfully combine to prevent the insertion of these protective clauses in specifications, the organized workers will find it a difficult matter to maintain the union standard of wages. It is, therefore, imperative that we should seek legislation that will make it impossible for large firms to discriminate unfairly against organized labor in this manner.

Through a protective tariff and a system of bonusing the steel industry in Canada, the steel corporations are enabled to hold a strong position among the industries of this country, and it is our duty to prevent these corporations from arrogantly and arbitrarily fixing the terms upon which they can do public work. As a matter of information, we cite the cases of the Toronto City Council and the Board of Education, whose work was not tendered on because the specifications called for the "union or prevailing" rate of wages. Several steel firms notified these representative bodies that they would not recognize the word "union" in the specifications.

Adverting to the Canadian Manufacturers' Association's labor bureau in England, the report had this to say:

The great influx of immigrants into Canada since last we met in Victoria, B. C., renders it necessary for special efforts to be made by the congress to meet the new conditions their coming presents. It may be taken for granted that Canada will continue to be the center of attraction for immigrants. This means that renewed and greater efforts will be required on the part of the congress, as well as on the part of individual unions, to secure the protection of workmen, both here and among the new arrivals, as well as to perfect our working organization, so as to secure the adherence of these new associates. The problem also requires consideration in order to circumvent the efforts of such individuals and bodies who are more or less careless in their representations made to induce immigrants to come to Canada.

A paragraph of the report was given to private detective agencies, which were represented to be multiplying in number and increasing greatly in activity, and becoming specially troublesome in the labor world:

Recent developments in the industrial world reveal the fact that labor unions are a special field for the operations of the private detective, and there is a positive necessity for legislation limiting the powers of such agencies to avoid serious trouble

in the future. We would therefore recommend that any information calculated to confirm the opinion that these agencies are the instigators of lawlessness and acts of violence be forwarded to the secretary of this congress, so that the executive officers can take such steps as they deem advisable to protect the organized wage workers of Canada.

Satisfaction was expressed with the progress of the eight-hour movement, and trades and labor councils were urged to profit by the example of the International Typographical Union.

The Anti-Strike Law.

Concerning the Trades Dispute Investigation act, which was passed by the Dominion Parliament last session, and which prohibits strikes on public utility works, on railroads, in coal and other mines the report says:

Your Executive Committee, after careful consideration, gave its hearty indorsement to the principle of the bill. Organized labor does not want to strike to enforce its demands if the consideration of them can be attained without recourse to that remedy. The strike has been our last resort, and as the bill continued our right to strike, but assured a fair hearing of the demands of the workers, there was nothing to do but to give our support to it. Nor is organized labor blind to the fact that in every great struggle the public has a large interest as well in the result as in the means adopted to reach that result. The least the public is entitled to is a knowledge of the merits of the dispute. This knowledge will be given under the procedure outlined in the bill.

The act has been tested already in the case of the machinists and the Grand Trunk Railway Company, and no better tribute could be paid to it than the settlement arrived at in that case, which has proved to be highly satisfactory to all parties concerned. The arbitration lasted three days, thus meeting the objections of those who, not unnaturally, thought that the delay possible under the bill might be too great to make its provisions of any avail.

In the discussion of the report the Railway Brotherhoods made a strong stand against the anti-strike law, but the clause relating to this measure was carried. It was decided to issue a request to all affiliated unions to contribute 10 cents per member toward a fund to pay the expense of sending to Great Britain an agent to counteract the misrepresentation of labor conditions in Canada. Senator McMullin's bill of last session, making it a penal offense for international officers to interfere in industrial disputes, was severely dealt with. A strong resolution against Japanese immigration was adopted.

C. A. C.

The World's Production of Coal.

The world's production of coal in 1906, says the United States Geological Survey, amounted to about 1,106,478,707 net tons, of which the United States produced 414,157,278 tons.

Since 1868, during a period of 39 years, the percentage of the world's total coal produced by the United States has increased from 14.32 to 37, and this country now stands far in the lead of the world's coal producers. It has been only eight years since the United States supplanted Great Britain as the leading coal producer, yet the increase in this country has been so enormous that Great Britain can no longer be classed as a competitor. In 1906 the United States produced 43.7 per cent. more coal than Great Britain and 85 per cent. more than Germany. Exclusive of Great Britain, the United States in 1906 produced more coal than all the other countries of the world combined.

It may also be noted that more than 96 per cent. of the world's production of coal is mined in countries lying north of the equator, the countries south of the line contributing less than 20,000,000 tons annually.

The Standard Roller Bearing Company, Philadelphia, Pa., has increased its capital of \$3,500,000 to \$5,000,000. Large additions are now being made to the plant and equipment for the purpose of enlarging the department for the manufacture of roller bearings for shafting hangars and also for the establishment of an entirely new department for the manufacture of roller bearings for trolley cars. The saving by the use of roller bearings on trolley cars is said to amount to about \$300 a year per car, and the demand is so great that a large addition to the plant is required to take care of this business.

Greater Loads on Rails.*

Increase in Weights of Baldwin Locomotive Works Engines Since 1885.

BY H. V. WILLE.†

The following conditions govern the service of a rail: 1. The chemical and physical properties of the rail itself. 2. The design of the rail. 3. The ballast and condition of roadbed. 4. The weights the rails are required to sustain. This society is more directly concerned with the chemical and physical properties than with any other conditions, and they have been the source of the most discussion. They are the ones, however, that can be most readily determined upon and fixed. If rails are made from material of an approved composition it then remains to give the ingots a sufficient reduction in rollings to finish them at a sufficiently low temperature and to discard sufficient from the ingot to insure a good rail. These features can be and should be all definitely fixed in a specification, and there should be no options whatever allowed. If it is necessary to discard 20 per cent, this should be positively fixed in the specifications. It is altogether wrong to specify 5 per cent., and to give the pur-

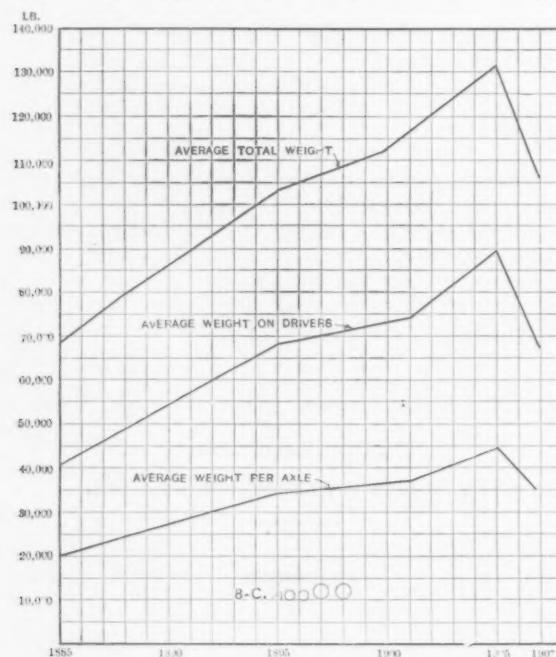


Fig. 1.—Relative Increase in Weights for 8-C Locomotives.

chaser the privilege of specifying a greater discard provided an additional price is paid. It is not necessary to make a proviso of this kind, for every purchaser has a natural right to it, and may exercise it regardless of specifications and such a qualifying clause only stands as an apology for the specified discard.

The limitations on impurities in rails have been rather definitely fixed for a number of years. There has been a decided tendency, however, to use a steel of a higher carbon than formerly, especially in the lighter sections. There is no reason for the proposition of making the heavier rails of lower carbon than the lighter sections. If the higher elastic limit of the 0.60 carbon steel is preferable for the lighter sections, it is equally advantageous for the heavier sections and affords an additional margin of safety. If the higher carbon is used on account of wear there should be no distinction in carbon. Since all sizes of rails are usually rolled from the same sized ingot there is much less work of reduction on the heavier rails than upon the lighter sections. This will not only affect the wear, but also the brittleness.

* Mr. Wille made a verbal contribution to the discussion on steel rail specifications at the Atlantic City meeting of the American Society for Testing Materials, June 21, 1907. The matter then presented has just now been expanded and reduced to writing by the author.

† Assistant to the superintendent of the Baldwin Locomotive Works, Philadelphia, Pa.

The present specifications do not go far enough. They should not only specify the chemistry and the physical tests, but they should also definitely specify the discard and the amount of reduction from the ingot. If this is done the drop is merely a check and assumes minor importance.

Locomotive and Car Weights.

But few accurate data are available upon which to base the design of a rail. It is well known that the weight of rolling stock has increased enormously during the past decade, but I have never seen exact figures on this subject. This is not only true of locomotives, but of cars as well. The locomotive weights have been considered of first importance in deciding upon the type of rail that is to be employed, on account of their weights being heavier than cars. The weights of cars, however, should have more prominence than they are given, as the load is more intensely concentrated than in the case of locomo-

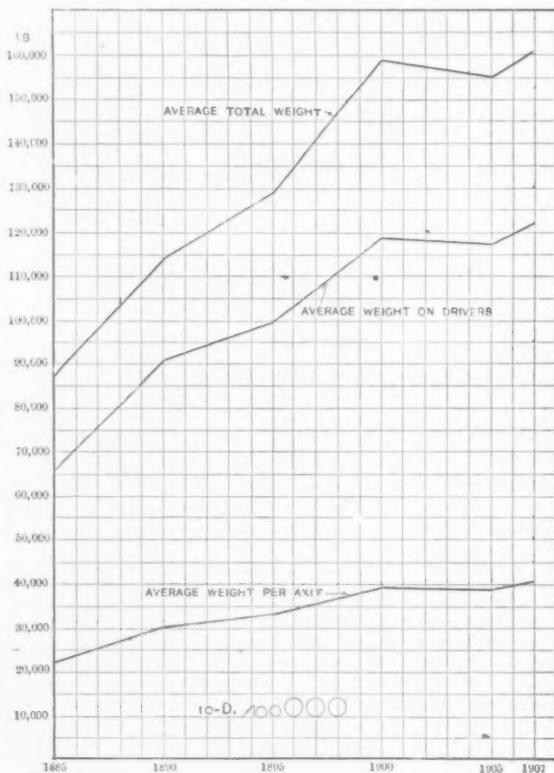


Fig. 2.—Relative Increase in Weights for 10-D Locomotives.

tives, because of the smaller diameter of the wheels. When cars pass certain points on the rail the loads are repeatedly applied, and it is the repeated applications of loads that induces fatigue. For instance, in a 100-car train with four-wheel trucks, the carloads are applied 400 times in rapid succession.

There does not appear to have been any systematized effort to ascertain whether the strength of the rail has increased in proportion to the increase in rolling stock loads. As a first step in this direction I have tabulated the following:

1. The total weight of engine.
2. The total weight on drivers.
3. The average axle load.
4. The per cent. of increase of loads.

The data cover each type of road engine built by the Baldwin Locomotive Works for the years 1885, 1890, 1895, 1900, 1905 and the first half of 1907. I have shown these results in tabular form, and have also plotted them in the diagrams which I am presenting herewith. All engines for export, as well as those built for switching, logging, mining and industrial service have been eliminated.

The diagrams show that the typical American passenger and freight engines have increased 90 per cent. since 1885, both in axle loads and in total weight on drivers.

Changes in Engine Types.

In the first 10 years the Consolidation engine, which is the favorite freight engine of the present day, in-

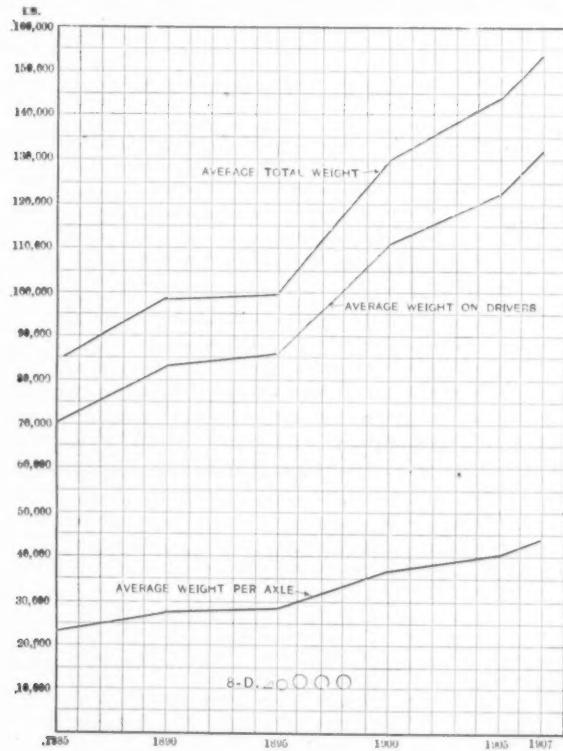


Fig. 3.—Relative Increase in Weights for 8-D Locomotives.

creased but 7 per cent.; the Mogul engine, which was largely used for a freight engine in the decade of 1880 to 1890, increased 17 per cent., while the 10-wheel engines

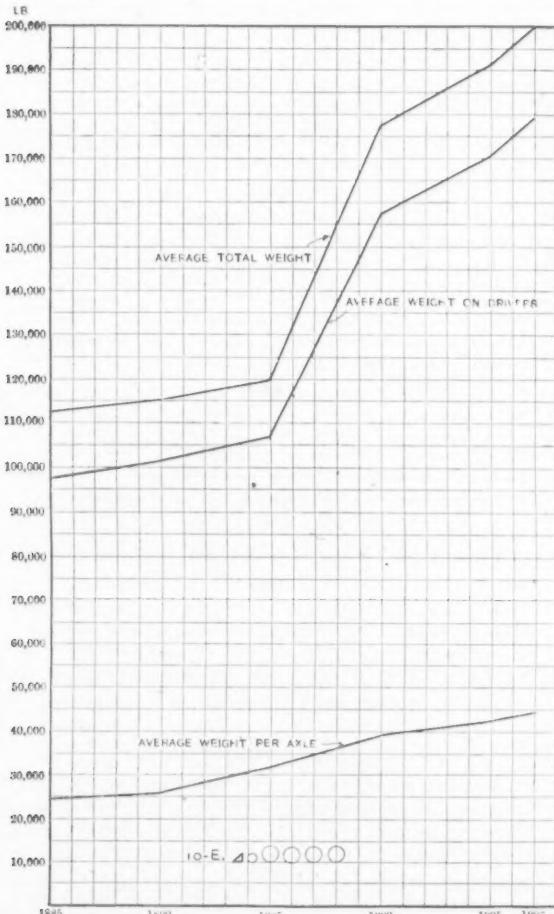


Fig. 4.—Relative Increase in Weights for 10-E Locomotives.

increased 49 per cent. The last named practically attained their greatest weight in the period from 1895 to 1900. In that time the Mogul and Consolidation engines

increased 60 per cent. in weight, and from 1900 all these classes converge to a common point, showing an increase of about 85 per cent.

The diagrams indicate that the next step was the employment of a greater number of driving wheels. This, in fact, has been the tendency of a number of roads during the past few years, the Atchison, Topeka & Santa Fe,

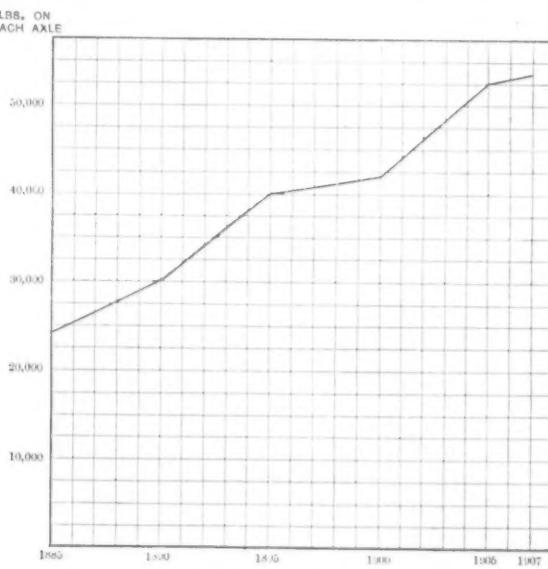


Fig. 5.—Increased "Greatest Load" on Each Axle.

the Northern Pacific and Great Northern being the pioneers in this field.

In 1885 the American type four-four engine was the standard passenger engine, having about 40,000 lb. on drivers, and the Mogul, or 10-wheeler, with 68,000 lb. on drivers, was the standard freight engine. In 1895 these types were still largely employed, the former having reached 68,700 lb., and the latter 99,400 lb., on drivers. In this decade the Atlantic type engine was brought out with 80,000 lb. on the drivers.

In 1900 the American type engine was almost entirely superseded by the Atlantic, Pacific and 10-wheel types of engines having 85,000 lb. on drivers for the former, and 118,000 lb. for the latter. During this decade the Consolidation, with 157,000 lb. on drivers, almost superseded the lighter types of engines previously used.

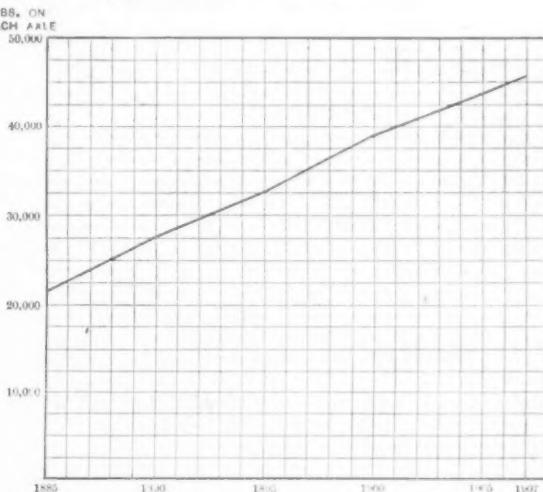


Fig. 6.—Increased Average Weight on Each Axle.

The decade of 1905 witnesses the advent of the Santa Fé type engines and of the Mallet compounds with 233,000 and 316,000 lb., respectively, on drivers, while the Atlantic and Pacific types have almost monopolized the passenger traffic.

Thus it will be seen that while the total weights and axle loads are both increasing, there is a tendency to distribute the load among a greater number of wheels, as has already been done by the three roads mentioned.

Load Increases Shown in Diagrams.

Fig. 1 represents the increases in total weight, weight on drivers and average weight per axle for eight-wheel locomotives. It will be seen that the maximum figures were reached in 1905, since which time there has been a decided falling off, owing to the practical abandonment of this type of locomotive in favor of Atlantic, Pacific and

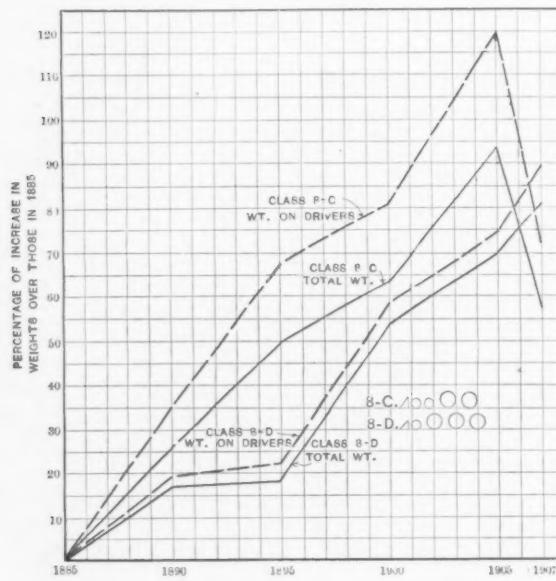


Fig. 7.—Per Cent. Increase in Total Weight and Weight on Drivers for 8-C and 8-D.

Prairie locomotives for passenger service on lines of heavy traffic. The highest driving axle loads are 45,000 lb.

Fig. 2 shows the same data for 10-wheel locomotives (4-6-0). The average total weight has increased from 87,000 to 161,000 lb., or 85 per cent., and the average weight on drivers has increased from 65,000 to 122,000 lb., or 88 per cent. The average weight on each driving axle was 21,900 lb. in 1885, and 40,600 lb. in 1907.

Fig. 3 is for Mogul engines. The average total weight increased from 85,000 to 154,000 lb., or 81 per cent., and

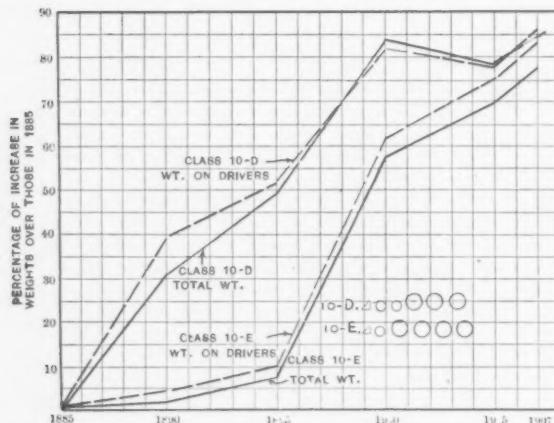


Fig. 8.—Per Cent. Increase in Total Weight and Weight on Drivers for 10-D and 10-E.

the weight on drivers from 70,000 to 133,000 lb., or 90 per cent. The driving axle weights rose from 23,500 lb. in 1885 to 44,000 lb. in 1907.

Fig. 4 is for Consolidation (2-8-0) locomotives. The average total weight increased from 112,000 to 200,000 lb., or 79 per cent., and the average weight on drivers increased from 97,000 to 179,000 lb., or 85 per cent. The driving axle weights rose from 23,250 lb. in 1885 to 44,750 lb. in 1907.

Fig. 5 shows the increased maximum axle loads. The highest in 1885 was 24,000 lb., and the highest in 1907 was 53,500 lb. The increase is 123 per cent.

Fig. 6 shows average axle weights for all types of locomotives, the increase in 22 years being from 21,500 to 45,500 lb., or 112 per cent. Figs. 7 and 8 show the data tabulated as percentages.

Load Increases Summarized.

These diagrams are very interesting, and I will briefly recapitulate their significance:

1. The average total weight on drivers has increased from about 69,000 lb. in 1885 to over 180,000 lb. in 1907, and has reached a maximum of 316,000 lb.

2. The average axle load has increased from 22,000 lb. in 1885 to 48,000 lb. in 1907.

3. The percentages of increase for the various classes of engines all converge toward a common point, showing that the increase is being cared for by distributing it among a greater number of drivers.

It would throw a great deal of light on the rail problem if data similar to what I have collected for locomotives were tabulated for freight and passenger cars and for weight and strength of the rail section. Such figures would give our engineers reliable statistics upon which to base their deductions.

Table A.—Details of Engines of Various Types Built by the Baldwin Locomotive Works in the Years Named.

Class.	Average total weight. Pounds.	Average weight on drivers. Pounds.	Average weight on axle. Pounds.	Number of engines.
6 1/2 C	58,000	50,000	25,000	1
8 C	68,600	40,800	20,400	76
8 1/2 C	57,228	37,078	18,539	5
8 1/2 C	50,000	35,000	17,500	2
8 D	84,300	69,900	23,300	33
10 D	86,700	65,200	21,730	27
10 E	112,250	97,125	24,281	8
10 1/2 E	60,000	52,000	13,000	1
1895.				
6 C	58,000	49,000	24,500	1
6 1/2 C	66,500	61,500	30,750	2
8 C	86,600	54,900	27,450	35
8 1/2 C	54,000	37,500	18,750	4
10 1/2 C	80,000	44,000	22,000	1
8 D	98,900	83,300	27,700	82
8 1/2 D	92,000	88,000	29,300	1
10 D	114,000	90,400	30,100	130
10 E	115,100	101,200	25,300	101
12 E	121,620	94,400	23,600	10
1896.				
6 C	77,000	64,000	32,000	1
8 C	103,000	68,700	34,350	44
8 1/2 C	89,500	60,000	30,000	4
10 1/2 C	132,000	80,000	40,000	12
8 D	99,700	85,400	28,460	14
10 D	129,000	99,400	33,130	73
10 1/2 D	92,500	71,500	23,830	2
10 E	120,000	107,000	26,750	23
1897.				
6 1/2 C	58,500	47,000	23,500	1
8 C	112,500	73,870	36,930	8
10 1/2 C	151,000	83,800	41,900	32
8 D	130,000	111,000	37,000	21
10 D	159,400	118,700	39,560	148
10 1/2 D	156,500	117,400	39,130	32
10 E	177,400	157,500	39,370	307
12 F	214,000	190,000	38,000	1
1898.				
8 C	132,400	89,800	44,900	25
8 1/2 C	113,000	80,000	40,000	1
8 1/2 C	60,000	42,000	21,000	1
10 1/2 C	199,000	104,000	52,000	104
8 D	143,700	122,400	40,800	77
10 D	155,400	117,800	39,260	176
10 1/2 D	198,500	141,400	47,130	112
12 1/2 D	225,000	147,000	49,000	113
16 1/2 D	345,000	316,000	52,660	5
10 E	191,000	170,500	42,600	720
12 E	197,000	165,800	41,700	51
12 1/2 E	231,000	181,000	45,200	13
14 1/2 F	285,700	233,000	46,600	52
1899.				
8 C	106,000	68,000	34,000	1
10 1/2 C	201,000	107,000	53,500	35
8 D	154,000	132,000	44,000	26
10 D	161,000	122,000	40,600	157
10 1/2 D	213,000	155,000	51,600	116
12 1/2 D	217,000	143,000	47,600	51
10 E	200,000	178,800	44,700	412
12 1/2 E	224,000	180,000	45,000	4
1900.				
8 C	132,400	89,800	44,900	25
8 1/2 C	113,000	80,000	40,000	1
8 1/2 C	60,000	42,000	21,000	1
10 1/2 C	199,000	104,000	52,000	104
8 D	143,700	122,400	40,800	77
10 D	155,400	117,800	39,260	176
10 1/2 D	198,500	141,400	47,130	112
12 1/2 D	225,000	147,000	49,000	113
16 1/2 D	345,000	316,000	52,660	5
10 E	191,000	170,500	42,600	720
12 E	197,000	165,800	41,700	51
12 1/2 E	231,000	181,000	45,200	13
14 1/2 F	285,700	233,000	46,600	52
1901.				
8 C	132,400	89,800	44,900	25
8 1/2 C	113,000	80,000	40,000	1
8 1/2 C	60,000	42,000	21,000	1
10 1/2 C	199,000	104,000	52,000	104
8 D	143,700	122,400	40,800	77
10 D	155,400	117,800	39,260	176
10 1/2 D	198,500	141,400	47,130	112
12 1/2 D	225,000	147,000	49,000	113
16 1/2 D	345,000	316,000	52,660	5
10 E	191,000	170,500	42,600	720
12 E	197,000	165,800	41,700	51
12 1/2 E	231,000	181,000	45,200	13
14 1/2 F	285,700	233,000	46,600	52
1902.				
8 C	132,400	89,800	44,900	25
8 1/2 C	113,000	80,000	40,000	1
8 1/2 C	60,000	42,000	21,000	1
10 1/2 C	199,000	104,000	52,000	104
8 D	143,700	122,400	40,800	77
10 D	155,400	117,800	39,260	176
10 1/2 D	198,500	141,400	47,130	112
12 1/2 D	225,000	147,000	49,000	113
16 1/2 D	345,000	316,000	52,660	5
10 E	191,000	170,500	42,600	720
12 E	197,000	165,800	41,700	51
12 1/2 E	231,000	181,000	45,200	13
14 1/2 F	285,700	233,000	46,600	52
1903.				
8 C	132,400	89,800	44,900	25
8 1/2 C	113,000	80,000	40,000	1
8 1/2 C	60,000	42,000	21,000	1
10 1/2 C	199,000	104,000	52,000	104
8 D	143,700	122,400	40,800	77
10 D	155,400	117,800	39,260	176
10 1/2 D	198,500	141,400	47,130	112
12 1/2 D	225,000	147,000	49,000	113
16 1/2 D	345,000	316,000	52,660	5
10 E	191,000	170,500	42,600	720
12 E	197,000	165,800	41,700	51
12 1/2 E	231,000	181,000	45,200	13
14 1/2 F	285,700	233,000	46,600	52
1904.				
8 C	132,400	89,800	44,900	25
8 1/2 C	113,000	80,000	40,000	1
8 1/2 C	60,000	42,000	21,000	1
10 1/2 C	199,000	104,000	52,000	104
8 D	143,700	122,400	40,800	77
10 D	155,400	117,800	39,260	176
10 1/2 D	198,500	141,400	47,130	112
12 1/2 D	225,000	147,000	49,000	113
16 1/2 D	345,000	316,000	52,660	5
10 E	191,000	170,500	42,600	720
12 E	197,000	165,800	41,700	51
12 1/2 E	231,000	181,000	45,200	13
14 1/2 F	285,700	233,000	46,600	52
1905.				
8 C	132,400	89,800	44,900	25
8 1/2 C	113,000	80,000	40,000	1
8 1/2 C	60,000	42,000	21,000	1
10 1/2 C	199,000	104,000	52,000	104
8 D	143,700	122,400	40,800	77
10 D	155,400	117,800	39,260	176
10 1/2 D	198,500	141,400	47,130	112
12 1/2 D	225,000	147,000	49,000	113
16 1/2 D	345,000	316,000	52,660	5
10 E	191,000	170,500	42,600	720
12 E	197,000	165,800	41,700	51
12 1/2 E	231,000	181,000	45,200	13
14 1/2 F	285,700	233,000	46,600	52
1906.				
8 C	132,400	89,800	44,900	25
8 1/2 C	113,000	80,000	40,000	1
8 1/2 C	60,000	42,000	21,000	1
10 1/2 C	199,000	104,000	52,000	104
8 D	143,700	122,400	40,800	77
10 D	155,400	117,800	39,260	176
10 1/2 D	198,500	141,400	47,130	112
12 1/2 D	225,0			

Mesaba Mining Problems.

The Business Section of Hibbing, Minn., to Be Moved.

The Oliver Iron Mining Company, which is stripping its Sellers mine at Hibbing, has reached ore and is ready to begin mining, but will not put a shovel into ore till next year. The Sellers has been an underground property, and has been mining on a considerable scale since 1894. A year ago it was decided to strip the property, which has a surface of from 60 to 90 ft., and in November last the work was begun. Several shovels have been employed since then, and a daily average of from 4000 to 7500 yd. of overburden have been removed ever since. The pit was started long and narrow, in the shape of an L, but the sides of the L are now being cut down and the pit presents the shape of a rectangle, some 1200 x 2000 ft. in area. Eight trains of standard gauge dump cars are working with three shovels in this pit, and the earth is carried to a dump a mile distant. When things are moving very satisfactorily each train, carrying 90 yd. of earth, is loaded and gets away in from 8 to 12 min. The Sellers pit will come close to the business part of Hibbing; indeed, already many houses have been moved and one large school building is but 100 ft. from the edge. With the work contemplated for next year at this mine many of the business houses of the city will be moved. Later the headquarters of the Oliver Iron Mining Company, its shops and warehouses, and the chief part of the business section of Hibbing must all be removed to new locations, and new locations, away from ore bodies, are hard to find at Hibbing, unless one goes a considerable distance to the south of the present town.

So extensive are the ore deposits all round Hibbing, and so active are operations there in the way of opening mines, stripping overburden, &c., that one of the most serious problems is how the roads shall get to their mine tonnages. South of the Sellers lies the Webb, and south of that, and adjoining it, the Susquehanna, the Duluth, Missabe & Northern road passing into the city between the two. The Susquehanna is determined to strip the 125 ft. of overburden on its ore, and the Webb is sinking a new shaft and caving ground that is wanted for tracks; so it looks as though the road would be forced around to the south. But this will mean other difficulties nearly as serious, and it simply must get to the Hull-Rust for the 2,000,000 or 3,000,000 tons a year that property is expected to produce indefinitely. Three or four hundred million tons of ore lies in the immediate vicinity of Hibbing, nearly all of which will ultimately be stripped, and it is distinctly a case of embarrassment of riches.

The stripping of the Susquehanna mine, which has been contemplated by the management for some time, will be the deepest work of the kind yet undertaken. There is about 125 ft. of overburden covering some 26,000,000 tons running to a much greater depth than the thickness of the overburden. It is probable that some form of stationary hoist for pulling loaded cars out of the pit will be adopted for the length of a locomotive approach would be a serious consideration both in point of expense and space.

The St. James mine, at Aurora, Mesaba range, which has been developed in the past year to the point where it is a shipper, has been closed by its operators, and may be idle during the winter. Corrigan, McKinney & Co. are lessees.

Labor Conditions Improving.

Shipments continue very heavy and for the month should be as large as any during the year in spite of wet weather. For a part of September the Duluth, Missabe & Northern road was hauling at the rate of 2,250,000 tons a month, but has let down recently. The month of October will show a decline from present figures, but the total for the year should be well up to 40,000,000 tons. Labor conditions are constantly improving and underground mines, which suffered the most, are getting their full crews again. The Western Federation of Miners has made changes in its official list on the Mesaba, indicating

discouragement with what has been done, and is becoming very weak all along the line. The Oliver Iron Mining Company has closed its Genoa mine at Sparta and has pulled the pumps. Sparta has been a hotbed of strikers and has caused more trouble than any other town on the range. It would not be surprising if other mines there close, because of the difficulty of getting local labor to work satisfactorily. But Sparta presents a condition absent elsewhere on the Mesaba just now.

Mine Accidents.

Two serious accidents have occurred on the ranges the past week. One at the Rolling Mill mine, Negaunee, caused the death of 10 men and the serious and perhaps fatal injury of several more. The brake band of the hoisting drum failed to work, the cage full of men starting to their work dropped from surface to the bottom of the shaft, 662 ft., and was dashed to pieces on the bottom of the sump, 22 ft. beneath the foundation timbers of the shaft. This hoist had been installed at the Rolling Mill mine a year ago and was brought from the Lake Angelina mine at Ishpeming, where it had been many years. The mine is a new property, this shaft having been sunk within the past two years, and this is the first accident that has ever taken place there. It is one of the properties of the Jones & Laughlin Steel Company. The other serious accident was at the Malta mine at Sparta, Mesaba range, where fire caught in the shaft and imprisoned three men, who were burned to death. Steam driven into the shaft suppressed the fire after three days' burning. The Malta is operated by Pickands, Mather & Co.

On the Menominee.

Near Amasa the Verona Mining Company (Pickands, Mather & Co.) will do extensive exploration. Some 15 years ago J. Parke Channing, then mine inspector, did work there in the hope of finding a continuation of the Bessemer lens of the Mansfield mine, but unsuccessfully. Now, on account of changed conditions in the iron trade, the territory is considered most promising. Both diamond drilling and sinking will be carried on there. The same company is sinking a shaft in the Felsch Mountain District, near the Calumet mine, where low grade ore has already been found at the depth of 135 ft. At 150 ft. the formation will be crosscut. In Atkinson township, Iron County, where little prospecting has been done, the same company will explore a large tract it has under option. A shaft is being sunk, and considerable machinery is on the ground. The Buckholz exploration, Iron River, was taken over by the company some weeks ago. This property joins the Beta mine of the Mineral Mining Company, and a shaft has been sunk, which the new operators will enlarge and deepen, crosscutting at depth. This is the first property Pickands, Mather & Co. have taken in that district.

Robert Whitesides of Duluth has the Prickett lands, near Amasa, in Iron County, Menominee range, and is preparing to explore on a liberal scale. He has been surveying these lands for some months. Also about a mile and a half east of Mansfield he is building a set of camps and preparing for extensive explorations on lands he has secured there. This work will be under the charge of W. G. LaRue, who found the Baraboo, Wis., iron ore for himself and Mr. Whitesides.

The Kimball mine, at Crystal Falls, has become a shipper. It has been under development for two years by Corrigan, McKinney & Co. The mine began shipments with a stock of 30,000 tons, and is expected to raise 25,000 tons more by the close of the season. The James mine has also begun shipment. It, too, has quite a stockpile, and will remove that and mine as much as possible during the remainder of the season.

D. E. W.

The American Steel Foundries, Chester, Pa., turned out a huge steel casting September 28. It weighed in the rough 140,000 lb., and finished 96,000 lb. The casting, which was made for the Baldwin Locomotive Works, will be used in pressing engine truck wheels out of cold steel.

The Virginia Iron, Coal & Coke Company.

The annual report of the Virginia Iron, Coal & Coke Company, covering the operations of the year ending June 30, 1907, shows a gratifying gain on the results of the previous year. Following is the income account, compared with that for the year ending June 30, 1906:

	1907.	1906.
Gross earnings from—		
Furnaces	\$3,588,643	\$3,340,923
Foundries	86,015	79,486
Coal mines	933,269	944,140
Coke ovens	650,058	649,412
Saw mills	1,832	11,611
Grist mills	188,554	
Crescent Works	202,035	62,721
Totals	\$5,650,406	\$5,088,293
Operating expenses—		
Furnaces	\$2,857,860	\$3,053,523
Foundries	83,296	67,707
Coal mines	746,548	758,161
Coke ovens	590,332	579,544
Saw mills	1,477	7,170
Grist mills	182,850	
Crescent Works	203,127	63,430
Totals	\$4,665,490	\$4,529,535
Net earnings	\$984,916	\$558,758
Other income	82,453	22,078
Total income	\$1,067,369	\$580,836
Interest, taxes, &c.	407,362	420,392
Surplus	\$660,007	\$160,444

The operating expenses during the past year were charged with \$301,786.74 for depreciation accounts, comprising five different funds.

The general balance sheet as of June 30, 1907, is as follows:

Debits.
Real estate and plant..... \$13,605,441.11
Equipment..... 239,339.26
Securities owned..... 196,863.20
Sales ledger balances..... 762,201.19
Sundry bills ledger balances..... 31,953.67
Open accounts..... 40,932.84
Bills receivable..... 1,317,464.96
Advances to cashiers and superintendents..... 7,326.80
Cash balance at commissaries..... 1,606.20
Cash on hand..... 56,294.57
Sinking fund..... 638.75
Stock of general material:
Pig iron..... 44,139.88
Other products..... 70,195.00
Raw material..... 270,200.33
Supplies..... 202,182.59
Merchandise..... 153,107.87
Farm products..... 21,676.44
Total..... \$17,021,564.66

Credits.
Capital stock..... \$10,000,000.00
In the hands of the public..... \$8,641,600.00
In the treasury of the company..... 1,358,400.00

First mortgage bonds.....	5,138,000.00
Prior liens outstanding:	
Carter C. & I. Company bonds.....	505,000.00
Unpaid vouchers.....	272,817.44
Unpaid pay rolls.....	98,583.58
Accounts payable.....	21,844.92
Taxes accrued.....	18,978.73
Fund for furnace repairs.....	324.86
Bills payable.....	76,875.00
Bond interest accrued—V. I. C. & C. Company bonds.....	85,633.32
Bond interest accrued—Carter bonds.....	6,312.51
Profit and loss.....	797,194.30
Total.....	\$17,021,564.66

From President Henry K. McHarg's accompanying statement the following is taken:

The past year has been the most satisfactory one since the reorganization of the company, January 1, 1903, especially the last six months of the year, January 1 to July 1, 1907, during which period it was enabled to earn not only its interest, taxes, and contribution to sinking funds, but to add to the credit of profit and loss account \$505,000.

The labor situation the past twelve months has been worse, if anything than the year before, and not only has the company been obliged to pay advanced wages

in its own mines and at its furnaces, but the character of the labor itself has been of the most shiftless sort. If it were not for the steam shovels bought in the last two or three years it would have been impossible for us to have obtained enough ore from our mines to keep our furnaces going. This labor situation has added to the cost of production of iron very materially, but owing to the quite rapid advance in prices this was more than counterbalanced by the figures received for iron sold.

The company made in the year ending June 30, 1907, a total of 202,453 tons of iron, and this amount was produced wholly by iron ores derived from local sources, a very large proportion of which was mined from the mines of the company. The coal business has continued to be very gratifying, and the prices received have shown a steady increase. We have been able to continue our sales at points in the South, reached by the Virginia & Southwestern and Southern Railway companies, and the amount of coal that we have been able to dispose of in that territory has been only limited by our ability to get cars for its transportation and miners in our mines to produce it. Most of the coke produced by the company is consumed in its own furnaces. The coal mined during the year was 1,166,445 tons; coke produced 394,791 tons.

So far we have not been able to do anything with our lease of the Potts Valley properties except to pay royalties, as the Norfolk & Western Railway Company has not been able to complete its branch line of railroad, which it is now engaged in building, to the various ore properties covered by that lease. However, we are hoping to make some progress in this direction in another twelve months.

Recognizing that the only weak position of the company was its ore supply, the management has been endeavoring to increase its holdings of these properties, and in the year just closed has consummated the purchase of what was known as the Scott properties, some 20,000 acres lying contiguous to the Virginia & Southwestern Railway in Tennessee, for the sum of \$97,500: cash, \$20,625, balance payable in one, two, three, four, and five years installments, with 5 per cent. interest. This property has exceeded our best anticipations, and, we believe, insures to our Bristol furnace a supply of ore necessary to run it for a long period. The meager developments which we have been able to make so far seem to carry out fully these expectations, and a royalty of 25 cents a ton, it seems to the management of the company, would pay for the whole cost of the 20,000 acres.

The company has also acquired the iron ore rights in what is known as the Ballou properties, a fissure vein containing a low phosphorus ore, in Ashe County, North Carolina. This ore property has been favorably known for many years. Its great drawback has always been the distance from railroad facilities, which is about 32 miles. Believing, however, that the business contributed by this company's furnaces is so valuable to the Norfolk & Western Railway that sooner or later it could be induced to extend one of its branches to this ore property, which presents no very serious difficulties, it was deemed best to acquire the mineral rights, which we have done, by the payment of \$60,000 cash.

We have continued to spend large sums of money this past year in improvements at the company's furnaces and on its ore properties; also in developing additional coal property. We are glad to say that by the first of August we finally were able to start the Radford Furnace, and it looks as if our expectations were going to be realized there and that we will be enabled to make iron at a very low cost, doing away with a large part of the labor formerly necessary to operate the furnace.

On January 1, 1907, the Southern Railway Company paid 12½ per cent. toward its purchase of the Virginia & Southwestern Railway stock, and since the close of the fiscal year (on July 1, 1907), paid an additional amount of 12½ per cent. with interest at 5 per cent. This leaves \$1,004,500 still due from that company on account of the purchase of the stock.

We have kept up our sinking funds during the year

on the coal and ore properties, and have retired in all 766 bonds of \$1,000 each—751 Virginia Iron, Coal & Coke Company bonds, costing \$709,241.25, and 15 Carter Coal & Iron Company bonds, costing \$15,783.33.

Trademark Registrations Heavily Increased.

WASHINGTON, D. C., October 1, 1907.—The notable success of the Bonynge trademark act, which went into force April 1, 1905, is attested by figures just compiled for the forthcoming annual report of the Trademark Division of the United States Patent Office. The new law has now been in force two and one-half years, and the record of applications and registrations thereunder is a most surprising one, reflecting not only the prosperity of the country but also the readiness of manufacturers and dealers in all lines to avail themselves of a liberal and practicable statute for the protection of industrial property.

Applications and Registrations.

In the three months following the taking effect of the act, and up to the end of the fiscal year 1905, no less than 9710 applications for registrations were made under it. In the following fiscal year, ending June 30, 1906, 10,888 additional applications were filed, making a total of 20,098 to July 1, 1906. In the fiscal year, ending June 30, 1907, the total number of applications filed was 7918, or a grand total under the Bonynge act of 28,516.

The requirement concerning the publication of trademarks prior to registration prevented the making of allowances under the new act during the first three months in which it was in force, but in the fiscal year 1906 there were registered 10,408 marks, and in the year 1907 there were 8838, making a total of 19,246 registrations under the Bonynge act to July 1, 1907. Of the 9270 applications unregistered a comparatively small number were rejected, and the remainder are pending, chiefly subject to amendment.

To appreciate fully the astonishing record made under this act, it is only necessary to glance at the operations of the Trademark Division under former laws. In the 24 years from 1881 to 1905, when the Bonynge act took effect, only 60,000 applications were received, or approximately 2500 per annum. Of this total 36,166 were allowed registration, or about 60 per cent. From the passage of the original trademark act of 1870 to its repeal by the act of 1881, approximately 12,000 applications were filed in the Patent Office, of which about 8000 were allowed registration, or an average of a little more than 1000 applications and 700 registrations per annum. These statistics show that in the past two fiscal years the annual average of trademarks registered has been four times the number of applications under the law in force prior to the passage of the Bonynge act and eight times the number of registrations. The efficiency of the new trademark act is very strikingly illustrated by the fact that in the period from April 1, 1905, to September 25, 1907—slightly less than two and one-half years—30,300 applications have been filed, or more than one-half as many as were received by the Patent Office in the 24 years prior to the enactment of the present law.

The Cause of the Increase.

The cause of the remarkable record under the new statute is not far to seek. The Bonynge act provides for the registration of trademarks used in interstate commerce, which were not protected under the act of 1881, the courts holding that the old law applied only to "marks used in foreign commerce and commerce with the Indian tribes." Another cause of almost equal importance is the fact that soon after the Bonynge act went into force, it was construed to require the reregistration of old marks previously registered for foreign commerce, in order to protect their use in interstate commerce under Federal jurisdiction. The direct result of the ruling regarding the reregistration of old marks is seen in the enormous number of applications filed during the first 15 months in which the law was in force, the total being 20,

598, as compared with 7918 in the second year under the Bonynge act. It was predicted a year ago that there would be a falling off in future filings, and that the annual number of applications would probably range between 8000 and 10,000. Reregistrations are now practically completed, and the increases over the old law hereafter will be due, first, to the advantage of protecting marks used in interstate commerce, and, second, to the wider recognition of the value of protection under the Federal law.

Quite as significant as the large number of applications filed under the Bonynge act is the proportion of trademarks which are allowed registration, which reflects the careful attention which manufacturers and dealers are giving to the selection of marks conforming to the same peculiar provisions of the statute. For the fiscal year 1906, when the applications were 10,888, the registrations numbered 10,408, and in 1907, when the applications aggregated 7918, the registrations numbered 8838, or nearly 1000 more than the applications received during the year. Of course, this excess represented trademarks registered during the year for which applications were made in the preceding year.

Efficiency of the Currier Law.

The Bonynge act, however, is not entitled to all the credit for the notable progress made in the development of the trademark system in the past two and one-half years. The supplemental act, which took effect July 1, 1906, known as the Currier law—named for the efficient chairman of the House Committee on Patents—embraced several important amendments to the Bonynge act, and has proved an exceedingly wise piece of legislation. This law provided for the classification of trademarks and for the protection of an entire class by a single registration. Before this law was enacted there were thousands of manufacturers making a considerable variety of goods, who was prevented from registering their trademarks under the old law because of the prohibitory cost, which in many cases would have amounted to several thousand dollars. Under the Currier act a single registration covers all goods of a similar class, so that a manufacturer of hardware, for example, may protect a score or more of different products belonging to the same general class at the cost of registering a single mark.

The Bonynge and Currier acts made necessary a very complete reorganization of the Trademark Division of the Patent Office, and under the supervision of Chief Examiner E. L. Chapman the work of the division has reached a high degree of efficiency. The expert and clerical staff has been materially increased, and it is now stated that applications are taken up for action within a fortnight of the date of filing, and that amended cases receive attention within the week in which the amendments are filed.

W. L. C.

A Railroad Moved Up Hill for a Dam.—Along the Susquehanna River for more than 13 miles, the Columbia & Port Deposit Railroad's tracks have had to be elevated 25 ft. above their former bed. This is part of a remarkable engineering undertaking—the building of a dam across the river at McCall's Ferry to utilize the great hydraulic energy now going to waste. The construction of the dam will raise the level of the water 60 ft., and the slack water will extend all the way up to Safe Harbor. At its original grade, the tracks of the Columbia & Port Deposit, which is a part of the Pennsylvania Railroad system, ran the risk of being submerged. There was nothing to do but "move up the hill." The McCall's Ferry Power Company, builder of the dam, had the new road bed made at a contract price of \$1,250,000. Work on the elevation began August 1, 1906, and was completed September 12, 1907, in little more than a year. During construction, the old road was abandoned, so that the benching of the steep rock bluffs along the river might be facilitated. The new road bed is built wide enough for two tracks. Concrete, for which stone was obtained from a nearby quarry, was used in the masonry bridges.

THE IRON AGE

1855-1907.

New York, Thursday, October 3, 1907.

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RICHARD R. WILLIAMS,	- - - - -	HARDWARE EDITOR.

The Efficiency of Labor.

The gravest evil from which this country is now suffering, graver by far than the exaggerated dangers from monopolies or from freight rebates, is the decline in the efficiency of labor. It finds expression in slouchy work on the part of those who know how to do better, and poor work on the part of those who have never been taught or are incapable of learning. To the more serious defect of lowered quality is added the troublesome feature of lessened quantity. It is a curious fact that the one question above all which is uppermost in the minds of manufacturers and other employers of labor, and which is privately discussed by them with helpless iteration, is so rarely touched upon in public utterances. The hope of developing some remedy is the only consolation to the employers of labor when they face the prospect of a decline in the volume of business.

There has been an extraordinary demand for labor of all kinds. So far as that has raised wages and directly increased the cost of production employers have had no grievance, although it is a troublesome and difficult matter to carry them back to the normal level. Manufacturers know that prices for their products usually decline more rapidly than the labor cost, and must be willing to face that contingency. The laws of supply and demand never operate so promptly in the one case as they do in the other.

As for the quantity of output of labor, that, too, responds fairly well, when the demand for labor declines. The process of weeding out the lazy and the inefficient begins promptly, and it may be accepted as a general fact that few managers have not thoroughly examined their rolls with a view toward making their selections. The percentage, usually, will be small, but the moral effect is quite out of proportion to the numbers. During the past two years the knowledge that a job was waiting for any man who was willing to take it has had a demoralizing effect upon all labor throughout the country. The fact will be firmly realized soon that steadiness, reasonable industry and acquiescence in necessary measures of discipline are primary conditions for employment, and that simple application for work is not the only qualification.

There is every reason to hope, too, that a lessened demand for labor will be reflected in better quality of work, although in that respect deeper causes have been operative than temporary high pressure of production. The effect of leveling down which has been the curse of the labor unions cannot be so quickly eradicated. It is true that the concentration of industry into larger units

tends to deprive an individual workman of the hope of starting on his own account, and the necessity for preliminary scientific and technical training is closing him out of the ranks once open to him of managers and superintendents. It is further true that in the days of an extraordinary demand the manufacturer has often permitted or even encouraged some sacrifice of quality for the sake of quantity. But granting that all these factors have been at work, there remains a residuum of wretched work which must be directly charged to the spirit in which labor is facing its tasks. It almost seems as though the hard school of adversity can alone bring back a realization of the fact that the world owes a living only to those who deserve it.

Interference with the Freedom of Contract.

A revolutionary doctrine in the relations between common carriers and shippers has been announced by the Interstate Commerce Commission. The business man who ships or receives freight by rail can no longer rely upon the rates quoted to him by the carrier, and even the contract value of a bill of lading has been destroyed and nullified, in so far as it relates to any stipulation as to the rate. "Regardless of the rate quoted or inserted in a bill of lading," says the commission in *Poore vs. the C. B. & Q. Railroad*, "the published rate must be paid by the shipper and actually collected by the carrier." The commission also states in this decision: "While shippers largely rely upon the rates quoted by freight agents and billing clerks, the law charges them with knowledge of the lawful rates."

The iron and steel trade will perhaps suffer more embarrassment from this new doctrine than any other industry, because the cost of freight is a very important factor in contracts which involve a large tonnage and a proportionately large amount of money. The promoters of a new railroad or any important construction contract have to figure closely on the amount of money that will be required, and for this reason they usually buy their materials delivered. A mistake or misunderstanding as to the rate may involve a heavy loss, which the shipper can no longer protect himself against by a contract or understanding with the carrier as to the rate.

The cost of freight has become an uncertain factor in submitting estimates for any contract. The only exact information as to this cost is contained in the records of the Interstate Commerce Commission at Washington, which are inaccessible to the shipper. Even the published tariff which a prospective bidder may obtain from the railroads does not give him legal information, for after his shipment is delivered, or while it is in transit, some defect may be discovered in the documents on file at Washington which may invalidate the rate and bring into force some other rate twice or three times as high. Recently a shipment of 2000 tons of steel was made from Pittsburgh, and at the last moment, after the steel was loaded on the cars, it was discovered that there was a trivial defect in the rate which made it necessary to hold the shipment 10 days on the cars until the "flaw in the title" could be corrected. One of several roads interested had failed to file its formal "concurrence," and although this, from a business point of view, had nothing to do with the rate itself, as the road in question would have received its regular tariff revenue from its portion of the haul, its failure to "concur" would have made an endless amount of trouble and involved a large loss had it not been discovered.

It has been customary to make contracts for con-

struction materials covering a period of a year or more, or even several years, in which the mill or the seller assumes the cost of freight, protected heretofore by contracts with the carriers. The commission holds that a railroad cannot pledge itself to carry future shipments at present lawful rates. An expert traffic man, with the aid of the information he can gain from the railroads, can make a reasonably safe guess as to what the present rate may be for a shipment to any point, even if he does not have exact legal information, but he has no means whatever of making even a guess as to what the cost of freight may be six months or a year hence, when a large contract may be only half fulfilled.

The bill of lading is one of the oldest forms of contract in use among business men. It is supposed to have originated among the ancient Phoenicians, 3000 or 4000 years ago, and it has been universally held in so high regard, by the courts as well as by business men, that it ranks with the bill of exchange and the promissory note as a negotiable instrument. The stipulation as to the rate or charge for carriage is one of the two fundamental elements of a bill of lading. Without this stipulation the document becomes a mere receipt for the goods, and it seems almost incredible that the Interstate Commerce Commission, or even Congress itself, would have the power to destroy one of the oldest and most sacred of the free contracts in use among merchants.

Under this doctrine the railroad becomes an irresponsible corporation, having no power to make contracts with business men to cover the service which railroads are built to perform. The only lawful rates for this service are inaccessible documents in the files of the commission at Washington; and even if they were accessible, an expert in traffic affairs might make mistakes in searching the records. Since the dawn of civilization it has been supposed that freedom of contract was the foundation and the most sacred right of commerce. To the ordinary business man it would seem as though the carriage of freight is the chief business of a railroad, and that the filing of tariffs at Washington is only an incident of that business, in which the railroad, as a responsible business corporation, can take the risk of seeing that the contracts which it makes with shippers are duly legalized by the filing and publication of the rates. The public interest would be amply protected by placing this responsibility upon the carrier.

Merchant Versus Manufacturer.

A recent development in the Scotch steel trade recalls the time when the merchant interest was so important a factor in the iron and steel trade of Pittsburgh and the Mahoning and Shenango valleys. Fifteen years ago, and up to the time when the consolidations changed the whole aspect of the Central Western steel industry, the various blast furnaces and steel companies in those districts often found the situation dominated by the trading element. Many who are active in the affairs of the large steel companies to-day, or who sold out a few years ago to the consolidations and are now onlookers, can recall how the markets for Bessemer pig iron and steel billets used to respond to the operations of buyers and sellers. These merchant firms had no investment in plants, but their influence in the market was at times greater than that of all the blast furnacemen and steel manufacturers of the two valleys combined. The manipulative possibilities of the three cornered situation supplied by Bessemer pig iron, Bessemer billets and wire rods, with conversion

deals and short sales as part of the stock in trade of the Pittsburgh merchants, will be remembered by those who manufactured pig iron or steel in the Central West in the last decade of the nineteen hundreds. When demand fell off and furnaces and steel works were scrambling for orders, the manufacturers winced under the tactics that seemed so easily to make an aggressive trader the arbiter of the market for the time being. But the consolidations have done away with all that, and Bessemer iron and Bessemer billets will probably never again furnish the speculative possibilities that existed in that halcyon period of the Pittsburgh merchant and broker.

What is referred to above is suggested by the position in which the Scotch steel manufacturers have recently found themselves. We are told that there has developed a test of strength between the Associated Scottish Steel-makers and the large merchant firms which have been able on occasion to assert themselves quite strongly in that market. Prices have been maintained for some time on a high level. The products of the Scotch works to a very large extent are marketed by the strong merchant firms, whose resources enable them to make prompt settlements with the mills, while they in turn give long credit to their customers. The mills, having little contact with consumers, are dependent upon the regular renewal of the jobbers' contracts. In the summer months the jobbers had been waiting, in the expectation of lower prices. Some of them apparently did not fully cover on their fall business and in some cases have made sales based on the belief that prices would ease off. Such jobbers have been buying from others who had more material contracted for at low prices than they needed, and the latter have split their profit, so that on some of these resales plates and angles have gone at \$2 to \$2.50 a ton less than the price the manufacturers are trying to maintain. The position of the manufacturers is made harder by an advance in fuel, and they aver that no reduction in the price of their products is possible.

At a meeting early in September the associated manufacturers arranged for the closing down of one steel plant and are planning to limit the supply and maintain prices. The bear operations of the merchants are alleged by the manufacturers to aim really at the breaking up of the association of the latter. The contest has much resemblance to some situations that have been known in the iron trade of the United States, but with the difference that in this country the maneuvers were not so publicly made. Here, largely due to the consolidation movement, the merchant interests have no such approach to even occasional command of the situation as appears in the Scotch steel trade. It is unlikely, moreover, that the Scotch manufacturers will secure the independent market position they seek short of some plan of actual consolidation.

Naval architecture is developing far greater structures than anything yet attempted on land. A publication issued by the Cunard Company presents some striking comparisons as to size between the new *Lusitania* and the largest buildings in the world, showing how the latter have been surpassed in altitude or length by this recent creation of the shipbuilders. Huge as this great vessel is, announcement is now made that the Hamburg-American Company proposes to build one whose dimensions will be still greater. An order has been given to Harland & Wolff of Belfast, Ireland, for a ship of about 50,000 tons, which is 5000 tons more than the *Lusitania*. The length of this vessel will be about 800 ft., and its name will be *Europa*. It is noteworthy that the equip-

ment will comprise both turbine and reciprocating engines, both sets to be used for steaming ahead, lessening vibration, while the reciprocating engines will facilitate going astern when necessary. This vessel will not be built for speed, as it is to make only 18½ knots per hour.

CORRESPONDENCE.

Amorphous Graphite as a Lubricant.

To the Editor: There is printed in your issue of July 18, 1907, on page 178, a letter commenting rather unfavorably on statements made by the writer with regard to the lubricating properties of amorphous graphite. This letter is signed by William Burns, who says he has been an engineer for some 25 years, and that during this period he has given considerable attention to the practical use of graphite as a lubricant, which, in view of the general trend of his ideas is rather surprising in that his remarks savor more of theory than of practice—and ill informed theory at that.

In one breath, for instance, he likens flake graphite to strips of tissue paper and amorphous graphite to paper balls; in the next breath flake graphite is made to bear the same relation to amorphous graphite as flat stones to round stones in the bottom of a swiftly running brook, both comparisons being preposterous in the extreme, the truth being that, in texture, flake graphite is to powdered (or amorphous) graphite about as gravel to soft clay. Likening the running water in a brook, then, to the oil on a bearing (which, I take it, is Mr. Burns' idea) the action of flake *vs.* powdered (or amorphous) graphite would be, in point of slipperiness, as a gravel bed is to a clay bed in the bottom of a trout stream—and any old fisherman who has waded unawares upon clay in a swiftly flowing stream can vouch for the devilish slipperiness of the latter.

Mr. Burns says that "the function of flake graphite is to attach itself to the minute irregularities which are known to exist in all metal surfaces, &c." Very good, but, as he states, these irregularities are only "known" to exist—they cannot be seen. Why? Because they are microscopic and not visible to the naked eye. Now, in all truth, isn't it ridiculous to assume that a flake of graphite which one can plainly see without spectacles will fit into and fill up one of these microscopic irregularities as effectually as powdered graphite of an adhesive nature and so fine that the individual particles can scarcely be seen even under a powerful glass—a soft, smooth, air floated, gritless, unctuous graphite powder? A gallon of oil could be put into a pint measure just as easily.

Then, too, what Mr. Burns has to say with regard to amorphous graphite forming "paste balls" is a mere statement that to my absolute knowledge cannot be supported in actual every day use for, as a matter of fact, amorphous graphite, because of the finer pulverization possible with it, unites or incorporates more intimately with oils than flake graphite and remains suspended therein for a longer time—long enough to feed through lubricator tubes without clogging if mixed in the right proportion, namely, one teaspoonful of graphite to a pint of oil.

To any interested engineer who wishes personally to investigate and prove this statement and see for himself the superiority of amorphous (or powdered) graphite over flake graphite as a lubricant, the United States Graphite Company, Saginaw, Mich., offers special opportunities for the test.

H. C. WOODRUFF.

SAGINAW, MICH., September 27, 1907.

The freight car movement on the Pennsylvania Railroad September 29 was larger than on any other day in the history of the company, 8630 cars having passed Lewistown Junction, one of the points at which counts are made. On September 28 and 29 the movement amounted to 15,402. The best previous record, 8268 cars, was made on May 16, 1907. For the week ending midnight, September 28, the total freight car movement past Lewistown Junction was 41,332, an average of about 6000 cars a day.

Indiana's Iron and Steel Interests.

W. S. Blatchley, State geologist of Indiana in his thirty-first annual report, which covers the year 1906, says that the construction by the United States Steel Corporation at Gary, Ind., of what will be eventually the largest system of blast furnaces and steel works in the United States, makes it an assured fact that Indiana is again to become one of the large iron producing States of the Union, though most of the raw material may come from the Lake Superior region. The report points out that Indiana was once an important iron producing State, some of the furnaces using Indiana ores exclusively, and that the iron ore deposits are worthy of development. Charles W. Shannon of Bloomington, Ind., one of the field assistants of the Geological Department, has a paper in this report dealing with the local ore deposits. He says:

"The supply of raw materials within the State is unlimited. New developments are being made along many lines and old interests are being revived, which were formerly held in check through lack of means of transportation and inexperienced management. When we go back to the years 1830-1870 and find a dozen blast furnaces then in operation and producing a fairly good tonnage of iron, we cannot fail to see that Indiana was a large producer of iron. The furnaces were located as follows: St. Joseph at Mishawaka, one at Logansport, the Old Virginia or Cincinnati in western Monroe county, the Richland in Greene county, the Ironton in Martin county, the Brazil, the Lafayette or Masten on Otter Creek south of Brazil, the Planet or Star, northeast of Harmony, and the two Western Iron Company furnaces at Knightsville, Clay county; the Indiana furnace on Brouillet's Creek near Clinton, in Vermillion county, and the Vigo furnace at Terre Haute, the last one to go out.

"Eastern furnaces, with lower railroad rates and better facilities for handling ore, and the opening of the great ore deposits of the Superior region and other districts, have kept Indiana from returning to the manufacture of iron. But in the last few years interest has again revived in the ore deposits of the State. The deposits will undoubtedly prove a paying investment to those who carry out their development. While none of the deposits would be considered extensive, compared with the great ore producing districts, yet the aggregate shows a fair tonnage. The larger deposits, which can be more easily worked, would probably yield 15,000,000 tons and the smaller deposits would easily bring the total up to at least 25,000,000 tons. In many cases the smaller deposits contain the best grade of iron, which would fully compensate for the extra cost of mining. Further developments and information from the use of core drill may materially increase the above estimate. The methods of prospecting in the Indiana fields have not only been carried out in the iron ore fields of Greene and Martin counties, but also extensively in the coal fields of southern Indiana and in the limestone and cement shale areas. By the use of picks, shovels, drills and other hand tools, and dynamite, vertical faces were cut on the outcrops extending from the surface down through the entire body of ore into the underlying formations. The length of these faces varied from 5 to 100 ft. In some cases where formations were broken and irregular, some drifting mining was done in order to determine more fully the dip and extent of the deposits."

Turbine Engine Instruction.—An evidence of the ground gained by the steam turbine is seen in the fact that the new Stuyvesant High School in East Fifteenth street, New York City, will offer a course this winter in the practical handling of a turbine engine. It will be the first course of its kind to be offered in a public trade school. A 250-hp. turbine has been installed in the building to serve the double purpose of generating electricity and for laboratory work. The school also has a reciprocating engine. Dr. Frank Rollins, principal of the school, says that it is necessary to teach a boy both types of engines.

PERSONAL.

Sidney B. Wight, formerly with the Michigan Central Railroad, has been appointed general purchasing agent for the New York Central Railroad interests, to succeed Dexter Fairchilde, who has resigned.

Kommerzienrat Dr. A. Haarmann of Osnabrueck, a member of the Council of the Verein deutscher Eisenhuettenleute, is now in this country.

Wm. H. Tolman, director of the American Institute of Social Service, 287 Fourth avenue, New York, read a paper on "Industrial, Sanitary and Safety Devices" before the International Congress of Hygiene and Demography, at Berlin, Germany, on September 28.

W. C. Runyon, New York, president of the Struthers Furnace Company, Struthers, Ohio, has returned from a trip to Europe.

J. E. A. Moore, formerly of the staff of the Wellman-Seaver-Morgan Company, is now associated with John W. Seaver, consulting engineer, with offices in the Caxton Building, Cleveland.

S. H. Bullard, vice-president and sales manager of the Bullard Machine Tool Company, Bridgeport, Conn., sails on October 3 for an extended business trip to Europe.

Albert Pott, Waterbury, Conn., who has had a long experience in the practical operation and the building and designing of machinery and mill construction, and was for the past five years designer of special and automatic machinery, has opened an office in room 62, Apothecaries' Hall Building, Waterbury, Conn., to do special and automatic machine designing, mechanical drafting, jigs, fixtures, &c.

Louis M. Lincoln, for a number of years manager of the Standard Machinery Company, Providence, R. I., has resigned and connected himself with the E. A. Eddy Machinery Company, dealer, in the same city.

Daniel Davis, connected with the Thomas Iron Company for years, has retired. Mr. Davis has lately been superintendent of the Lock Ridge furnaces, but leaves active work to live in retirement at Catasauqua, Pa. He is one of the oldest furnacemen in the State.

Marcel Foucard, recently connected with the Filer & Stowell Company, Milwaukee, Wis., in the capacity of chief engineer, has resigned his position to accept a similar post with the Bolinders Engineering Works, Stockholm, Sweden, Max Ruess, formerly in the employ of the Wm. Tod Company, Youngstown, Ohio, but recently returned from Germany, where he has been pursuing studies in mechanical engineering, has succeeded to the position vacated by Mr. Foucard.

Frank H. Ball, president of the American Engine Company, Bound Brook, N. J., is visiting San Francisco on a tour of the Pacific Coast.

R. D. Carr, San Francisco manager for the American Bridge Company, is making an Eastern business trip.

H. C. Ryding, who for a number of years has been general superintendent of the rail mill at Lorain, Ohio, now operated by the National Tube Company, has been appointed assistant to Vice-President Frank H. Crockard of the Tennessee Coal, Iron & Railroad Company, Birmingham, Ala., and entered upon his new duties October 1.

George C. Farkell, who has been superintendent of the skelp mill of the National Tube Company, Lorain, Ohio, has been appointed master mechanic and general superintendent of the rail mill of that company's plant, to fill the vacancy caused by the resignation of H. C. Ryding.

Charles J. Rice has been made superintendent of the blast furnace plant of the Norton Iron Works, Ashland, Ky.

E. W. Buechling, of Pittsburgh, has been appointed assistant manager of sales of the Pittsburgh Automatic Vise & Tool Company, Pittsburgh, Pa.

Harry E. McCoy, for several years superintendent of the Pittsburgh Mfg. Company, has resigned his position to engage in business on his own account, and has opened an office at 619 Ferguson Building, Pittsburgh. He will act as manufacturers' agent, handling a line of bolts, rivets, castings and general machinery.

OBITUARY.

The announcement comes from Germany that Hubert Claus, the general manager of the Eisenhuettenwerk Thale, died August 21 at St. Mercino di Cascrozza, where he had gone for his health. Mr. Claus, who was well known in this country, which he visited repeatedly, practically created the Thale Works with its sheet mills, its foundries and its great factory for enameled ware.

J. W. McCUNE, superintendent of the Woodward Iron Company's furnaces, Woodward, Ala., was instantly killed September 18 by a bursting water pipe. He had the reputation of being one of the best managers in the Birmingham District.

The American Electrochemical Society.

The twelfth general meeting of the American Electrochemical Society will be held October 17 to 19 in New York City. It will be opened by an evening session on October 17. This session as well as the morning session following, will be held at the Chemists' Club, 108 West Fifty-fifth street. The morning session of October 19 will be held in Havemeyer Hall, Columbia University. Headquarters for registering and information are at the Chemists' Club. Hotel headquarters are at the Hotel Cumberland, Fifty-fourth street and Broadway.

On the afternoon of the 18th, an excursion will be made to the laboratories of Thomas A. Edison. A special car will be provided on the Delaware, Lackawanna & Western Railroad, the train leaving West Twenty-third street at 2.15. That evening a subscription dinner will be held in Liederkranz Hall. Ladies are specially invited.

On the afternoon of the 19th an excursion will be made to the new Pennsylvania Railroad power plant at Long Island City, the New York Electrical Testing Laboratories and other points of interest to be announced at the meeting. That evening a smoker will be tendered to the American Electrochemical Society by the Chemists' Club.

During the meetings there will be an exhibition of some novelties of electrochemical products and apparatus at the Chemists' Club. The papers to be read are as follows:

Illustrated lecture on "Diamond and Moissanite; Natural, Artificial and Meteoric," by Dr. Geo. F. Kunz; lecture on "Deflocculated Graphite," by E. G. Acheson of Niagara Falls, with demonstrations and experiments; "The Electrothermic Reduction of Iron Ores," by Albert E. Greene and Frank S. MacGregor; "Discussion of the Electric-Furnace Experiments for the Production of Pig Iron at Sault Ste. Marie," by Dr. Joseph W. Richards; "Electric-Furnace Experiments," by Dr. H. N. Potter; "Discussion of Moissan's Experiments on the Boiling Points of the Metals," by Dr. O. P. Watts; "The Electrometallurgy of Zinc," by M. Gustave Gin; "A New Application of Chlorine in Metallurgy," by C. E. Baker; "The Heat Conductivity of Carbon," by F. A. J. FitzGerald; "Granular Carbon Resistors," by Prof. S. A. Tucker; "Physico-Chemical Notes on the Aluminates of Soda," by P. B. Sadler; "Action of Ammonium Persulphates on Metals," by J. W. Turrentine; "Notes on the Use of the Capillary Electrometer for Alternating Voltages," by M. G. Floyd; "Electroscopic Determination of Radium in Some Tufa at Hot Springs," by Dr. Herman Schlundt; "Electrolytic Separation of Silver and Copper," by H. W. Gillett; "Electrolytic Determination of Minute Quantities of Copper," by E. E. Free; "Electrolytic Reduction of Nitric Acid," by Dr. H. E. Patten and Robinson; "Electrochemical Methods for the Qualitative and Quantitative Determination of Free Silicon in the Presence of Silica, Silicates, Oxides, Free Carbon and Carbide," by W. R. Mott; "The Nature of Electrolytic Conductors," by Dr. L. Kahlenberg; "The Electrolytic Theory of the Corrosion of Iron," by Dr. A. S. Cushman, with demonstrations; "The Treatment of Storage Battery Elements Before Putting Them Out of Commission," by Prof. O. W. Brown; "A Further Study of Concentration Shells," by Dr. Henry S. Carhart.

Prof. A. S. Tucker, Columbia University, is chairman of the New York Committee. Alois von Isakovics, Monticello, N. Y., is the local secretary.

David D. Allerton and Seymour P. Thomas of New York and William H. Carpenter of Philadelphia, Pa., have been appointed receivers for the Scofield Company, contracting engineer, Philadelphia, Pa.

Producer Gas for Power Purposes.*

The Efficiency of Typical Plants Using Hard and Soft Coals.

BY J. R. BIBBINS, EAST PITTSBURGH, PA.

One purpose of this paper is to emphasize the possibilities of the nonbituminous producer, which, it is believed, has not received the attention it deserves. Particularly is this true of the small isolated plant, which would doubtless be widely adopted were its merits more generally known. The large central station of 20,000 to 50,000 kw. capacity is a matter of more or less gradual evolution, but the isolated plant is entirely one of the present. In cities and other manufacturing centers the power question involves only steam, gas, or purchased electric power. Where natural gas is available, steam is practically "out of the running," and even without natural gas, manufactured gas often forms the most attractive fuel in spite of its high cost; witness the Philadelphia pumping station and the novel little plant operated by the Boston *Herald*. A careful study of the subject soon develops the fact that producer gas is an important factor. The popular opinion exists that it cannot compete at all with natural gas, but this is by no means universally true.

Limits of Competition with Other Gases.

The best means of analyzing the problem is to consider a definite equipment—for sake of simplicity, a non-bituminous plant as compared with one using natural or manufactured gas. Assume two 500 hp. plants. As the engine equipments are identical, their operating cost may be left out of consideration. There remains to be determined, for the two cases, the relative cost of gas delivered to the engines. This includes, in the case of producer gas, both operating and capital charges on the producer house proper; i. e., fuel, labor interest and depreciation. Assume, further, coal at 12,000 B.t.u. per pound, natural gas at 1000 B.t.u. per cubic foot, manufactured gas at 575 B.t.u. per cubic foot, engine efficiency at 11,000 B.t.u. per brake horsepower hour (full load), generator efficiency at 92 per cent, total producer efficiency at 65 per cent, and one spare (250 hp.) producer for 24-hr. service. Taking all these quantities into proper consideration, the result may be best presented graphically. Fig. 1 shows the total cost of motive fluid

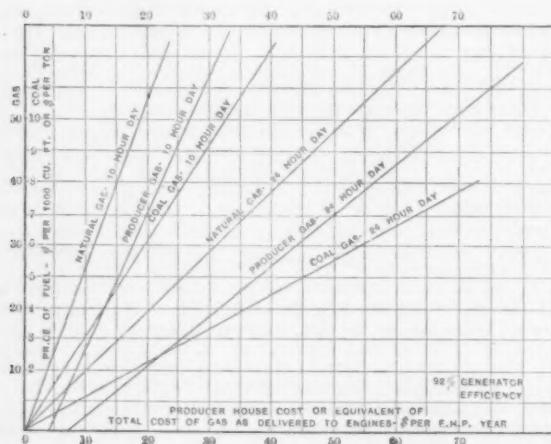


Fig. 1.—Comparative Fuel Costs for Natural Gas, Coal Gas and Producer Gas.

as delivered to the engines at various fuel prices. This cost is expressed in dollars per electric horsepower year for convenient comparison with purchased electric power. Thus:

	10-hr. day.	24-hr. day.
25c. natural gas = \$9.50 power.....		\$26.00 power.
\$2.50 prod. coal = 9.50 power.....		22.50 power.
40c. coal gas = 26.00 power.....		72.50 power.

In other words, for the short day's run, producer gas made from \$2.50 coal can just compete with natural gas.

* From a paper read before the Engineers' Club of Philadelphia.

at 25 cents per 1000, but it is considerably cheaper in the long run. This equalization of cost has been carried out for the entire schedule in Fig. 2; i. e., the price we

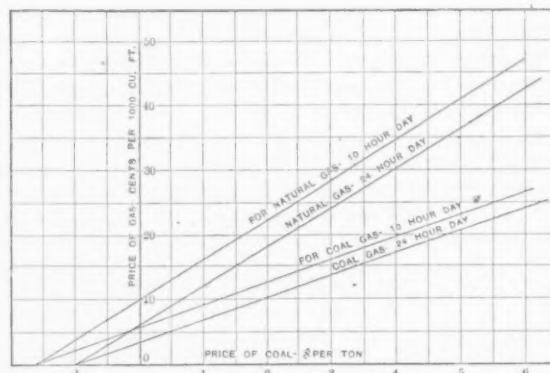


Fig. 2.—Price Chart, Showing Equalization of Cost of Producer and Other Purchased Gases.

can afford to pay for producer coal, in order to compete on an even basis with any price of gas, is shown on the horizontal scale. Thus:

	10-hr. power.	24-hr. power.
10c. natural gas = \$0.55 coal.....		\$1.05 coal.
15c. natural gas = 1.25 coal.....		1.85 coal.
20c. natural gas = 1.90 coal.....		2.65 coal.
25c. natural gas = 2.50 coal.....		3.40 coal.

This diagram serves to bring out clearly two points: First, that even in natural gas districts there is a legitimate field for the producer where small size anthracite can be had below \$3.50; and, second, that for power work, the cost of coal gas is practically prohibitive compared with producer gas. As the manufacturing cost is seldom below 40 cents per 1000, even a gas works could afford producer auxiliaries. The use of coal gas is, of course, of little moment in large plants, but in small city isolated plants it is often given consideration. These charts incidentally furnish a direct comparison between the cost of motive fluid delivered in the form of heat and in the form of electricity from water power or other plants. Of course, the operating and capital costs of engine and electric motor must be respectively added.

Results from a 25 HP. Plant.

There is plenty of evidence that we have not been too sanguine over producer gas operation, and to prove the point, the results from two plants may be cited: One a small anthracite plant of 25 hp., and the other a 500 hp. plant operating the works of the Norton Company, Worcester, Mass. This small plant may be regarded as an example of producer gas working under the most favorable operating conditions—14 hr. daily standby, 43½ hr. over Sundays. The following data summarize a week's run, chosen so as to bring into the average one starting period from over Sunday, when extra fuel is required to make up for starting losses.

Table A.—Test of a 25-Hp. Isolated Producer Power Plant.

Date	Duration of run.	Pro-ducer.	Boiler.	ducer.	Pro-		Remarks.
					Lbs.	Lbs.	
7-9-1906.	10½ Hrs.	630	184	2.3	3.1		Load approx. constant—25 hp.
Monday	....					
Tuesday	....10½	470	171	1.7	2.4		Plant loading factor (24-hr.)—34%.
Wednesday	..10½	315	137	1.2	1.7		Boiler coal, 29% of total.
Thursday	...10½	335	165	1.4	1.9		Coal—Anth. pea, 13,000 B.t.u.-lb.
Friday	....10½	300	140	1.1	1.8		Westinghouse equipment throughout.
Saturday	....4½	90	80	0.8	1.5		
Sunday	....	..	..	..	..
Week	....57	2,140	877	1.5	2.1		

The average coal consumption for the week works out 1½ lb. per brake horsepower hour for the producer alone, or 2.1 lb. including the fuel for a small steam

boiler used for blowing the producers. Although the producer, *per se*, showed a fair average efficiency—about 64 per cent.—the plant was considerably handicapped by the inefficiency of the small steam boiler necessary. In this regard, it is but justice to the producer art to say that in such small sizes the suction type is far preferable to the pressure, and it is certain that even a higher producer efficiency could be obtained. The test is presented simply to show the possibilities of producer work.

Efficiency of a 500 HP Plant.

The Norton plant contains a Westinghouse horizontal tandem double acting gas engine unit, and a single battery of Loomis-Pettibone bituminous producers, with the necessary auxiliary equipment. The fuel used is Pocahontas slack, which runs about 14,000 B.t.u. per pound. Under normal conditions, the plant operates 10 hr. per day (55 hr. per week), exclusive of Sundays. During the shutdown on Sunday, the producer is cleaned out, new fires built, and scrubbers and boiler also cleaned, if required. The load is fairly steady, averaging 75 per cent. of the plant capacity, with 30 per cent. total fluctuation.

Table B.—Operating Results of 500 Hp. Gas Power Plant.

Norton Emery Wheel Company, Worcester, Mass.

Number of weeks run.....	7
Average hours per week.....	53 hr.
Weekly output.....	12,464 kw. hr.
Average loading factor of plant.....	21.9 per cent.
Average loading factor of engine.....	78.7 per cent.
Coal used.....	Pocahontas slack.
Coal gasified in producer per week.....	23,441 lb.
Coal for building fires per week.....	2,376 lb.
Total coal used per week.....	25,817 lb.
Percentage auxiliary coal.....	10.14
Kw. hour.	B.h.p. hour.
Coal per unit in producer.....	1.88 lb.
Total coal per unit.....	2.07 lb.
Heat consumption per unit in prod.	26,300 B.t.u.
Plant efficiency (producer).....	12.96 per cent.
	14.1 per cent.

The above table summarizes a seven weeks' run on the plant under normal conditions. The item of 23,441 lb. is the amount of fuel gasified during the regular working day runs, inclusive of 14 hr. standby periods. "Total coal" includes also the extra fuel used for rebuilding the fires on Sunday, which amounts to over 10 per cent. of the actual producer coal. These results are striking. With a station load factor of 22 per cent. (corresponding to a little over three-quarter engine rating), the plant averaged less than 1½ lb. of total coal per brake horsepower hour, or 1.29 lb. exclusive of fuel for new fires. This is equivalent to about 18,000 B.t.u. per brake horsepower hour, or a thermal efficiency, from coal pile to engine shaft, of 14 per cent. At full rating, the plant would consume less than 1¼ lb. per brake horsepower hour with a thermal efficiency of approximately 15 per cent. or a plant operating only 10 hr. a day, this may certainly be regarded as excellent duty, and, if nothing further, it gives us the assurance of equal, or still better economy with continuous 24-hr operation on both engine and producer plant, which is the condition to be met in central station work. The conditions surrounding the operating of the Norton plant are thoroughly commercial in every respect, and no attempt is made at ultra-scientific methods.

A Comparison of Bituminous and Anthracite Producers.

Throughout a large part of the Eastern seaboard States, both hard and soft coal are equally available at prices not widely different, especially when considered on the British thermal unit basis. The question then arises: Does the greater expense and trouble of the bituminous plant pay in the long run? Speaking most conservatively, it is a matter deserving of close attention. To put the question into concrete form, the cost chart, Fig. 3, has been prepared upon the definite assumptions given below. The cost includes strictly producer house costs, both operating and fixed; *i. e.*, the total cost of the gaseous fuel delivered to the engine.

ASSUMPTIONS.

Type of Plant.—Anthracite—Continuous, pressure system.
Bituminous—Intermittent, pressure-suction system.
Size.—500-hp. (rated) plant, full load.
Two 250-hp. producers—10-hr. day.
Three 250-hp. producers (one spare)—24-hr. day.
Engine Room Costs.—Same in both cases.
Base Cost of Plants.—Dollars per hp. = Anth., \$14; bitum., \$22.

Erection.—5 per cent. of above base cost in all cases.
Running Repairs.—2.5 per cent. of base cost in all cases.
Interest, 5 per cent.; depreciation, 7.5 per cent.; taxes, 1 per cent. on variable cost.
Auxiliary Fuel.—Anthracite plant, 15 per cent. for boiler.
Bituminous plant, 10 per cent. for rebuilding fires.
Producer Efficiency.—(Total)—Anthracite, 65.2 per cent.
Bituminous, 68.2 per cent.
Heat Value of Fuel.—Anthracite, 13,000 B.t.u.
Bituminous, 14,000 B.t.u.
Engine Efficiency.—11,000 B.t.u. per b.h.p. hour.
Coal Consumption.—Anthracite = 1.3 lb. per b.h.p. hour.
Bituminous = 1.15 lb. per b.h.p. hour.
Labor.—Anthracite = 10-hr. power—One producer man, one ash handler—\$4.25 per day.
Anthracite = 24-hr. power—Two producer men, one ash handler—\$6.75 per day.
Bituminous—10-hr. power—One producer man, one helper, two Sunday cleaners—\$5 per day.
Bituminous—24-hr. power—Two producer men, two helpers, two Sunday cleaners—\$9.50 per day.

These assumptions are believed to be conservative. They are based on approximate present quotations, and only the strictly fixed charges (interest, depreciation and

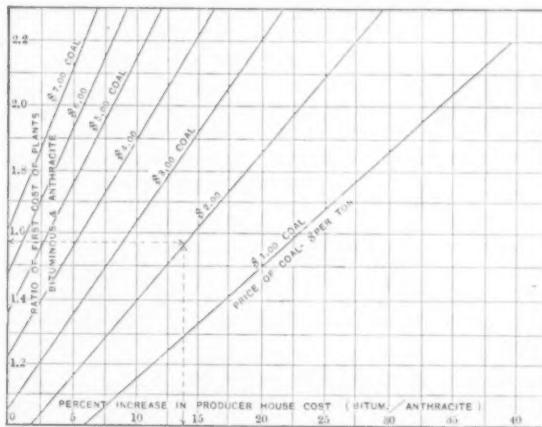


Fig. 3.—Relative Producer House Costs for Various Prices of Coal.

taxes) vary with the price of the plant, the other items (erection and running repairs) being held constant on base price. With this precaution, the figures at other than base price are not distorted.

This diagram, Fig. 3, shows the relative cost of gas (at a given price of coal) with different cost ratios for these two plants. This is for 10-hr. power only. At our base price ratio (1.57 = $\frac{\text{Bitum.}}{\text{Anth.}} = \frac{\$22}{\$14}$) the total producer house costs, with an average of \$2 coal, work out about 14 per cent. higher for bituminous than for anthracite plant, in spite of the fact that it has a somewhat higher overall efficiency. But, as the price of coal increases, so that the advantage of the anthracite plant decreases, so that bituminous gas would "catch up" at about \$6.80 coal.

The converse proposition is shown in Fig. 4, and perhaps brings this out in a clearer manner. The two scales show the relative prices of coal that may be paid in the two plants for the same cost of power, each diagonal representing a definite ratio of first cost. With soft coal at \$1, we may pay \$1.80 for hard coal and still come out even. Now, as the first cost of the bituminous plant approaches that of the anthracite we observe a decrease in the latter's advantages. Thus, with a first cost ratio of 1:1, we may only pay \$1.10 for hard coal with soft coal at \$1; and at \$3 coal, the situation is reversed—the bituminous plant being cheaper. This point is brought out by the dotted diagonal line sloping at 45 degrees and intersecting at equal intervals the other diagonals. These intersections have the special significance of representing the points of equalization of coal cost; *i. e.*, the critical line above which the anthracite plant has the advantage, and below which the bituminous plant.

To simplify the diagram, this line of equalization is plotted alone at the right, on Fig. 4, with an additional line for 24-hr. power. At our original base cost of plant, anthracite yields the lowest power cost up to a price of \$6.80 for 10-hr. working, and \$5.35 for 24-hr. power. At an equal first cost of plant, we cannot afford to use an-

thracite costing less than \$2.75 per ton for 10-hr. working, or \$3.60 for 24-hr. working; but a ratio of 2 : 1 anthracite holds good up to \$10 coal.

It is to be clearly understood that this argument is not intended to discredit in the least the bituminous plant, whether of the intermittent or continuous type, but rather to bring out the fact that each type of plant

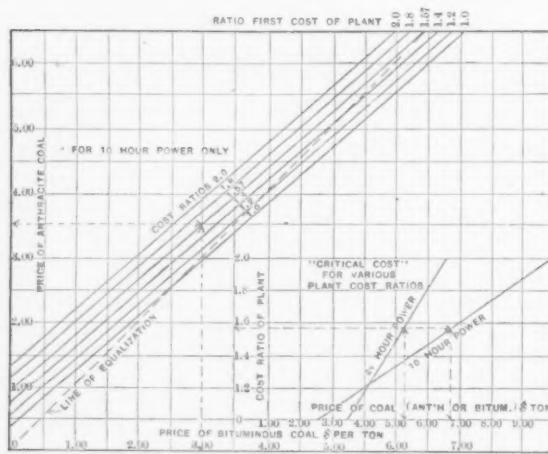


Fig. 4—Cost Chart, Showing Equivalent Anthracite and Bituminous Coal Prices for Various Cost Ratios of Producer Plants.

has its own particular field. It is possibly true that the demand for a bituminous plant has so completely engaged engineering attention that the possibilities of anthracite working have been for the time being overlooked.

Producer Fuels.

It is an evident impossibility to outline districts in the country where a certain type of producer may or may not be profitably employed. New mines are not only constantly coming up, but also new methods are being devised for utilizing fuel formerly considered unmarketable. To give an idea of the relative cost of various fuels, the following table has been compiled for a point about equidistant from anthracite and bituminous fields—Buffalo. The quotations are not recent, but were received simultaneously, so that the averages are relatively correct. Continuing the previous line of reasoning, we may compare bituminous Run-of-mine with a mixture of Buckwheat, Rice and Barley; both cost the same per ton—\$2.23. But from our foregoing chart, Fig. 4, it appears that for equal power cost, \$2.25 soft coal is equivalent to hard coal at \$2.85, which is even higher than the price of No. 1 Buckwheat at Buffalo—\$2.61.

Table C.—Approximate Average Prices of Producer Fuels.

	Dollars per net ton f.o.b. destination.			
	Pittsburgh.	Cleveland.	Buffalo.	Mine.
Anthracite.*				
Pea	2.88 ²	3.52 ²	3.16 ²	...
No. 1 (Buckwheat)	2.77	3.39 ²	2.61 ²	...
No. 2 (Rice)	2.46	2.24 ²	2.23 ²	...
No. 3 (Barley)	1.92	1.97 ²	1.85 ²	...
Bituminous.†				
Screened coal	1.40	1.95	2.25	1.10
Run-of-mine	1.25 ²	1.83	2.22 ²	1.00
Slack	.82 ²	1.43	1.75	.60
Screenings	.90	...	...	.60
Coke.				
48-hr. foundry	3.60	2.00	...	
72-hr. foundry	3.85	2.25	...	
Crushed	3.85	2.25	...	

² and ³ refer to the number of quotations averaged.

* September, 1905, quotations from two separate mines and general market.

† Quotations from separate mines. Pennsylvania bituminous coal.

It is interesting at this point to note the results of experiments that are being made at East Pittsburgh on the smaller sizes of anthracite for producer work. No. 1 Buckwheat is, of course, readily marketable; Rice and Barley, however (and Birdseye, as the still smaller size is sometimes called), are restricted by the difficulties encountered in efficient steam raising. Consequently, enormous quantities of these smaller sizes are already available at all old mines in stock banks containing hundreds of thousands of tons of good washed coal at a value of

about 50 cents per ton. The final waste product (culm) is also available in even greater quantities at practically no cost. Our experiments covered all these sizes in various mixtures, and thus far indicate that, excepting culm, this low grade fuel can be used successfully and with fair efficiency in our standard producer with proper care and control of the fuel bed.

Automatic Regulation of Producer Output.

It is the general impression that a gas holder of considerable capacity is an absolute necessity in a producer plant to insure at the engine a supply of gas of uniform quality and pressure. A holder can, of course, be made use of to advantage; it is a necessity in producer plants of the intermittent type, serving to equalize any irregularities in the quantity and quality of gas produced. On rapidly fluctuating load it is, of course, impossible, with hand regulation, to follow these fluctuations, and were a holder not interposed between engine and producer there would be an excess of gas one moment and a deficiency the next. In the intermittent system, where two kinds of gas—viz., water and air gas—are used, a mixing holder is an absolute necessity. Frequently separate holders are used for these two gases, which are then mixed in the proper proportions on their way to the engine.

In a continuous system, however, a holder is not a necessity, provided means are employed to control the production of gas according to the demand from the engines. Such a system has already been worked out in very simple form, and the results obtained are commented upon in a series of tests made at East Pittsburgh a short time ago are noted below. In principle the apparatus embodies the following parts:

1. A small pressure regulator of the diaphragm or the gasometer type, the interior communicating by piping to the gas main from which the engines draw their supply.

2. A steam blower of the ejector type, supplying steam and air to the producer in the required proportions.

3. A small throttle valve in the steam line to this blower connected by lever to the moving element of the regulator.

Such an apparatus (of the diaphragm type) is shown in Fig. 5. The movable diaphragm contained in the split

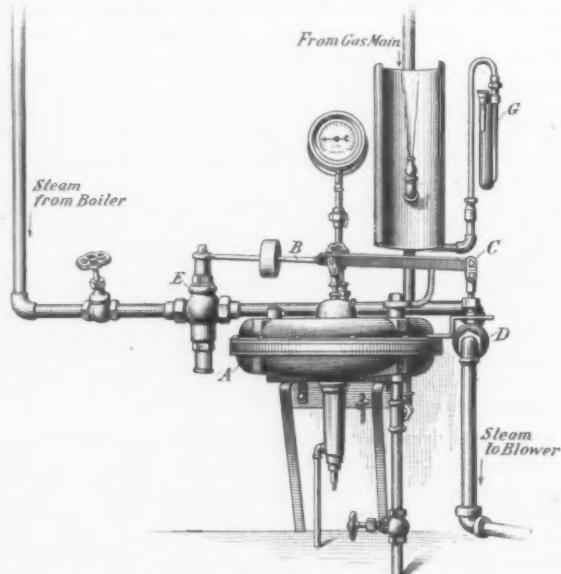


Fig. 5.—Automatic Regulator for Producer Work.

casing A connects by the lever B—fulcrum at C—to the throttle valve D. A pressure reducing valve, E, enables high pressure steam to be used, if desired. A pipe connects the under side of the regulator with the gas main. The tell tale flame gives a continuous indication of the character of the gas made, and the gage G shows the pressure on the gas main at all times. It is evident that a change in pressure in the main, due to greater or less demand from the engine for gas, will cause a movement of the diaphragm, and at the same time a corresponding change in the pressure of steam delivered to the producer

blower. On the other hand, the output of gas from the producer is entirely dependent upon the pressure of steam at the blower. The general result is that regulator and producer respond almost instantaneously to fluctuations in the pressure of and demand for gas. This system of regulation is so sensitive that the output of the producer may be varied from zero to maximum in a period of one

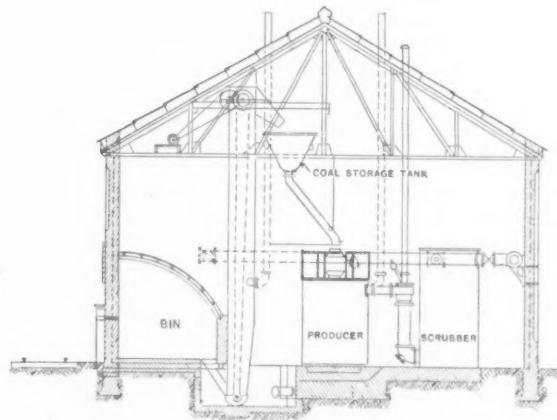


Fig. 6.—Section of Producer Power Plant.

or two seconds, while maintaining a practically constant pressure delivery in the gas main.

The net result of this system is not only automatic producer regulation, but the abolition of a cumbersome gas holder ranging up to 15,000 cu. ft. capacity and costing from \$160 up per thousand cubic feet. This reduces the standard producer plant to the simple unit system—generator and scrubber directly connected and self-contained.

POWER PLANT ARRANGEMENT.

The simple manner in which this scheme of plant works out in practice is well illustrated in a station re-

ground and can be readily tested for leaks. This producer equipment is in duplicate throughout, with the exception of the coal elevator and boiler for supplying steam to the producer. The excellent coal handling arrangement is clearly shown in the section. The steel-concrete building was constructed with overhanging tile roof—an excellent form of fireproof construction for gas power plants.

There is considerable advantage to be derived from an independent scrubber for each producer. This arrangement requires very little more space than with a centralized scrubbing plant, and being on the unit system, does not interfere with repair work when the plant is to be operated continuously. It also avoids a considerable amount of duplicate piping. The producer blowers are brought out into a concrete pit containing also the elevator boot, the whole covered by steel floor plates. This effectively confines what little noise is made by the blowers in action, and at the same time provides easy access to them.

Although with fireproof construction it is unnecessary to carry insurance upon a producer building, this is sometimes deemed desirable. The restrictions of the underwriters frequently result in a separation of engine and producer buildings. This unfortunately disturbs, to some extent, the centralization of the work of the power plant operating force; but, on the other hand, results in a lesser building cost. For the producer plant proper a cheap steel building is often adopted. In England this is carried still further, and practically no building at all is provided for the producers, as in the case of the handsome power station of the Midland Railroad terminal at Heysham Harbor. But in the United States, owing to the more rigorous climate, this is rather out of the question. In the plant of the Gould Coupler Company, at Depew, N. Y. (paper, American Society Mechanical Engineers, December meeting, 1906*), a compromise has been effected. While the generating equipment is housed in a substantial brick and steel building, the producer equip-

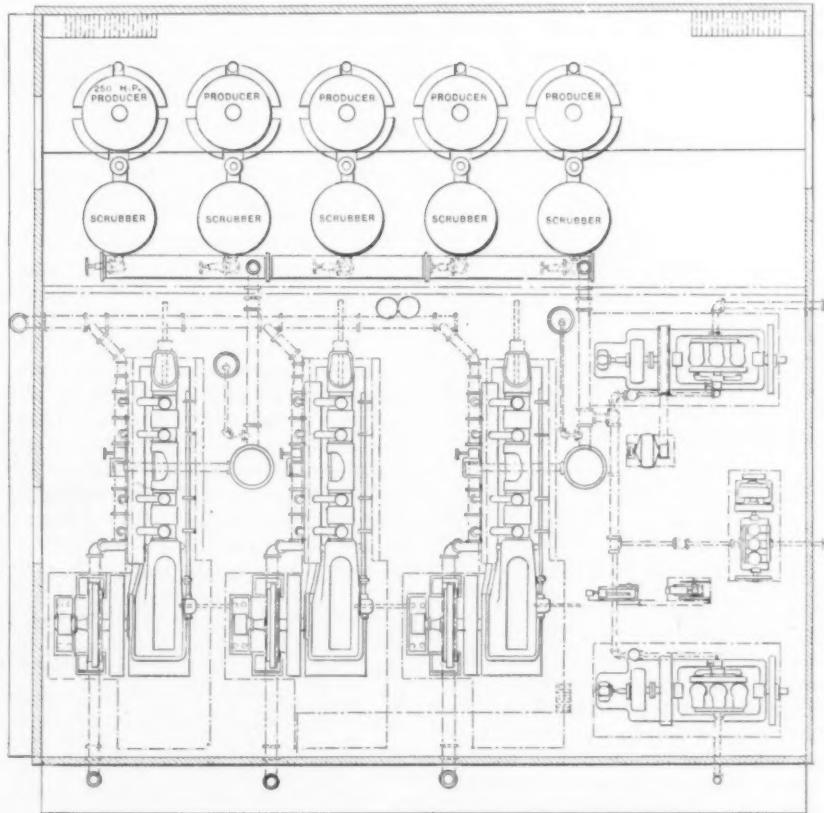


Fig. 7.—Proposed Layout for Industrial Plant.

cently put into operation, serving a large industrial works with light and power generated from anthracite coal. Fig. 6 shows a sectional elevation of the producer plant proper. Note the simplicity and directness of piping, due to the absence of a gas holder, all of which is above

ground, located for local convenience some 500 ft. away, is housed in a much cheaper structure having brick walls, corrugated steel roof, concrete floor and charging floor of boiler steel. In another plant of 400 hp. capacity, operat-

ed by the Citizens' Electric Company, Keene, N. H., both engine and producer equipment are contained in a single building, the latter occupying only about one-third of the floor space, which totals 7.6 sq. ft. per horsepower, including space for switchboard, transformers and office.

Coming now to the larger equipment, Fig. 7 shows a proposed layout for an industrial plant using nonbituminous fuel with producers of the type previously mentioned, and horizontal engines of the same size and type as installed at the Norton plant, upon which operating data have already been given. This plant has a maximum capacity of 1537 kw., which works out to 6.84 sq. ft. per kilowatt for a plant requiring 10 per cent. overload, or 7.75 sq. ft. per kilowatt for a plant requiring 25 per cent. overload capacity. For the horizontal units the limitations of space are fixed by three conditions: First, the space required for the removal of the rear piston; second, the side clearance required for the removal of the cross shaft, and, third, the front clearance required for the extended foundation necessary to provide sufficient stability for the unit when installed on insecure substrata. The latter space, however, may be very conveniently utilized for an elevated switchboard. It is very desirable to have the switchboard several feet above the floor level in order that it may be visible from all of the engine

of only 450 kw. capacity, but shows an average gross coal consumption of about 13 lb. per kilowatt-hour on a 24-hr. load averaging about three-fourths of the plant capacity. This is equivalent to between 14 and 15 per cent. thermal efficiency. On an average the three units are in operation about 97 per cent. of the time, there being no spare capacity in the plant.

There seems to be considerable doubt as to the ability of gas engines to handle alternating current load with generators in multiple. Such a belief is entirely unfounded. We may cite the experience of one builder alone—the Westinghouse Machine Company. Out of 97,122 hp. of gas engine operating January 1, 1907, in all parts of the world, fully two-thirds, if not a greater percentage, is in electrical work. At least 50 per cent. of this represents alternating current work, involving parallel operation; and even for 60-cycle work springs couplings are being dispensed with in the double acting type engine. Perhaps the best example of what has been accomplished in this line may be found in the gas engine railroad station of the Warren & Jamestown Street Railway Company, Warren, Pa. Fig. 8 represents a recording load chart taken from one of the units during its regular operation in parallel with another unit of smaller size on single phase, interurban railroad load. It is safe to say that a more rigorous test of the regulating ability of a power unit could not be found. The Warren plant has been in continuous operation since the close of the year 1906.

Finally, the results of the 30-day continuous 24-hr. tests upon a blast furnace gas engine at the Edgar Thomson Steel Works, Pittsburgh, may be of interest. This engine was operated day and night for an entire month to determine its permanent wearing qualities. During this period (730 hr.) the engine was in operation 99 1-3 per cent. of the time, with only two stops, one of which was due to an interruption of the gas supply and the other to a leaky water plunger. Half of each 24-hr. run was on rheostat load and the other half on foundry load. Continuous records of speed variation taken during these fluctuating loads showed, on an average, a total variation of only four revolutions, corresponding to but 2 2-3 per cent. of the total, or 1 1-3 per cent. above and below mean speed. This engine was of the same size and type as installed at the Norton and Warren plants, and it is now being replaced by a 1500-kw. twin-tandem unit, also to operate on blast furnace gas. This engine has 54-in. stroke and operates at 75 r.p.m. On natural gas it is rated at 3100 b.h.p., or 2000 kw. The low heat value of blast furnace gas reduces the rating considerably.

The Removal of Tar and Lampblack.

In closing the discussion of his paper Mr. Bibbins added the following interesting comment on the cleaning of producer gas:

One of the most difficult problems in producer gas work is the question of cleaning—*i. e.*, getting rid of the tar and lampblack. The Loomis-Pettibone system avoids the former, but not entirely the latter, which problem is now having the attention of producer builders. I may say that this tar destruction is the one feature of the Loomis-Pettibone system which has brought it to the front. In this system crude gas is drawn down through a secondary firebed and fixes the tar, but in so doing some of the product comes out as lampblack, which is almost impossible to separate by washing. At the present time apparently the only way to separate it is by a scrubber of the centrifugal type. At the plant at Depew, N. Y., considerable lampblack is produced, but it is not very troublesome. If allowed to accumulate it will fill up the 12-in. gas main from the holder in, perhaps, a couple of weeks, but it can at any time be readily flushed out with water and presents no operative difficulty except the dirt.

The tar question, in regard to the comparative value of fuels, is an interesting one. In a recent study of the tar content in the coal tested at St. Louis I found a fairly accurate curved relation between the tar produced and heating value. The higher the latter the more tar produced—in some cases as high as 600 lb. per ton of coal, in others barely 100 lb. Evidently, therefore, the fixation of the tar adds considerably to the overall producer efficiency. It may be interesting in this connection to know that in some of the St. Louis tests the rotary tar

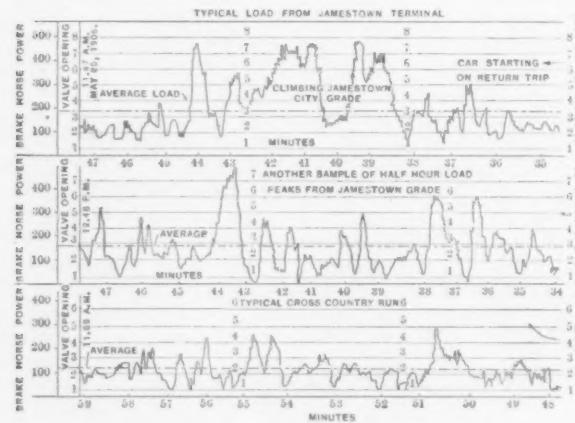


Fig. 8.—Load Curve of Street Railroad Gas Engine Station.

throttles. This space is also sometimes used for auxiliaries which are of small size and may be installed in the most convenient location.

The style of unit here shown (tandem, double acting, single crank) is generally considered the standard for power plant work, except in cases where specially large units are desired. The twin tandem unit has the advantage of some 5 or 10 per cent. lower cost per kilowatt, and greater compactness, but its overall efficiency is practically the same as two single tandem units. Unless a plant is of such large capacity that twin tandem units are necessary to reduce the number installed, it is obviously better and safer practice to retain the single tandem units.

This whole question of power plant arrangement involves an exceedingly interesting and profitable study of the relative value of spares—*i. e.*, the amount of excess capacity desirable to meet a given set of operating conditions, and its ultimate cost. From the preliminary study which the author has made of this subject at least one point has become very apparent—viz., that the very large capacity unit is by no means as necessary to secure economic plant operation as is the case in a steam plant. This conclusion is entirely at variance with the popular opinion. Although the subject cannot be gone into in further detail here, it is sufficient to note that not only the price per horsepower, but also the heat efficiency of high grade gas engine generating units are very nearly the same for a 100 or 1000 hp. unit.

Operating Results.

That high operating efficiency is not confined entirely to the horizontal type of engine is very evident from the results that have been obtained at the plant of the Gould Coupler Company, previously mentioned. This plant (equipped with Westinghouse vertical, three-cylinder, single acting engines and Loomis-Pettibone producers) is

extractor has been dispensed with by simply using the shell of the economizer from which the original air heating tubes had been removed. This shell was fitted up with internal baffles to intercept the tar held in suspension in the crude gas. But this, of course, could hardly be recommended as a practical condition.

That efficient gas cleaning can be accomplished has been demonstrated in the blast furnace gas power plant of the Carnegie Steel Company, Pittsburgh, Pa. The apparatus comprises a combination of vertical baffling washers in series with a centrifugal power scrubber, and can deliver gas to the holder cleaner than the surrounding air (Pittsburgh air, of course).

Perhaps the most important problem in connection with the use of "dirty" gas in gas engines is that of lubrication, but with the positive timing system the major difficulties have at least been overcome. In the Westinghouse system cylinder oil is introduced only on the induction stroke, when the engine is drawing in its gaseous charge. In passing the oil ports the piston rings spread oil evenly over the inner surface, so that the cylinder is lubricated in one out of every four strokes. A 500-hp. double acting gas engine at the plant of the Carnegie Steel Company, at Bessemer, Pa., was operated four days on crude gas direct from the furnaces. At the end of this time it was taken apart and the dirt cleaned out of the valves and chambers. Besides quantities of dust, pieces of limestone, coke and ore were found. Yet with this system of timed lubrication the cylinders showed no abrasion and both piston and gland rings were quite free.

Regarding the amount of steam used in a producer, 1-3 lb. per pound of coal gasified probably represents the minimum, and 2½ lb., as in the Mond by-product recovery system, about the maximum, the object of this excessive amount being to keep down the temperature of the fuel so as to preserve the by-products from disintegration. In the St. Louis tests the weights of steam varied from 0.3 to 0.6 lb. per pound of Pocahontas coal. There is one difficulty in using too little steam—i. e., in maintaining too high a temperature of fuel bed the formation of clinker will result, especially with the low grade cake coals. High temperature is the frequent source of clinker and the further we depart from this the better. This is, perhaps, the main reason why the Mond principle is so successful in handling low grade fuels.

As to the holder capacity. This should be considered simply a question of operative insurance. Of course the case of a single producer is somewhat similar to that of a single boiler. A boiler may give trouble; likewise the producer. A duplicate should, therefore, be installed in each case, if the situation warrants. To my knowledge a single case has not arisen where more than one producer is installed on the system above outlined that absolutely required a holder for continuous service. How much, then, are you willing to put to your equipment to insure against possible interruption? It seems exactly analogous to storage battery reserve. One man will consider a certain investment in storage batteries sufficient to insure normal working condition; another will duplicate it; a third will depend entirely on his prime movers.



Attention is directed by the *Railway Age* to the fact that in the seven years 1900-1906 the railroad mileage of the United States grew from 190,833 to 222,635 miles of road, an increase of 31,802 miles, or 16 2-3 per cent. The length of second track, sidings and additional tracks increased from 62,581 to 88,569 miles, a gain of 25,988 miles, or over 40 per cent. Gross earnings rose from \$1,336,000,000 in 1899 to \$2,346,000,000 in 1906 and net earnings from \$423,940,000 to \$790,180,000. Our contemporary says that the new construction record of the past seven years is not likely to be approached in the next seven years unless financial and political conditions change greatly, and adds: "The same may be said in regard to earnings, for although traffic throughout the country will continue to grow the returns may be even decreased, if the popular disposition continues to be unchecked. Are the seven fat years to be followed by seven lean years in the railroad business?"

San Francisco Notes.

SAN FRANCISCO, CAL., September 25, 1907.—After years of waiting San Francisco now has a steel mill in actual commercial operation. After the fire the A. Merle Company, which uses large quantities of tubing and steel rods for the manufacture of metal bedsteads, installed a rolling mill, and commenced working up scrap steel from the burned district for its needs. A complete open hearth steel plant was later installed, so that steel of any desired quality could be produced. The plant now has a daily output of about 20 tons of merchant steel, which is rolled into bars and sold in the local market. The Rudgear Steel Company has been incorporated with a capital stock of \$500,000, to carry on the manufacture of steel and take care of the growing demand. The stockholders include A. J. Merle, A. and W. A. Rudgear and J. F. Leahy. The plant, which is located at North Beach, covers two city blocks. Considerable quantities of scrap steel are melted, but the plant will continue in operation after all of the junk from the ruins has been disposed of.

The closing of contracts in the East by the Southern Pacific Railroad Company for steam and electric machinery for its new electric traction power house at Oakland, Cal., for the operation of its local lines in that city and Alameda by electricity, will be followed by the purchase of much additional material in the way of rails, overhead equipment, &c. The first section of the new line in connection with the San Francisco Bay Ferry system will be operated electrically in about one year. The entire cost of the installation is estimated at \$3,000,000. Of this the oil burning power plant will cost \$900,000; the 80-ft. overhead trolley electric cars, \$500,000; track, overhead construction, &c., \$1,600,000. The power house will be erected at the foot of Fruitvale avenue, near the estuary, so that a salt water condensing system can be easily operated. The equipment for which contracts have been closed includes two 5000-kw. Westinghouse-Parsons turbo-generator sets and 10 water tube boilers. Alternating current will be generated and distributed to several substations, where motor-generators will furnish direct current for the operation of the cars.

The Abner Doble Company, an engineering concern which erected a large building on South street some time ago for use as a rolling mill, has completed its financial arrangements and will install the plant. The equipment will also include two 15-ton open hearth steel furnaces, in which steel scrap will be used. The company has accumulated a good stock of steel scrap.

The Risdon Iron & Locomotive Works, San Francisco, has postponed the sale day of delinquent stock on the recent assessment to October 17.

The Lacey Steel Works, Los Angeles, purpose to install a temporary branch plant in Stockton, Cal., for the construction of a number of steel tanks for the Southern Pacific Company. These tanks will be used for the storage of fuel oil piped from the wells. An order for 350 tons of tank sheets has been placed already.

Mining Equipment.—The San Francisco branch of the Arthur Koppel Company, Koppel, Pa., is doing good pioneer work in the introduction of this concern's steel cars, light rails and labor-saving devices in connection with mining and contracting, in spite of adverse water freight conditions. Fifty dump cars, with portable rails, have been sold to the People's Water Company of Oakland, Cal. In the aggregate there is a large Coast demand for mining cars, rails, steel pipe, air compressors, air drills, small electric generators, &c., for driving tunnels for mines and for water conduits. The Southern California Mountain Water Company has awarded a contract for four tunnels aggregating 13,010 ft. for the Dulzura Conduit Line. Several new smelters are also projected on the Coast. The Nevada Copper Company's engineers are doing preliminary work at Luning, near Goldfield, Nev., with a view to the early erection of a smelter. The company is now shipping ore regularly, and the proposed smelter will be in a position to also work all of the ore from the Walker Lake District. The Blossom Mining

Company, which has leased the Searchlight Mining & Milling Company's mill, at Searchlight, Nev., has secured figures on electric equipment. It consists of hoist, compressor, pumping and lighting plants, gasoline engines and electric generators. A mill is to be installed in the Corn Springs District, in California, 40 miles from Salton, by the Bankers' Mining, Milling & Investment Company. Tunnels are being run by the Skidoo Mines Company on the property near Tonopah, pending the installation of a 100-stamp mill. A water power electric plant will supply motor power. The Goldfield-Jupiter Mining Company will erect a reduction plant with 10 stamps. A copper smelter is to be installed in the copper mines recently developed on the Washougal River, 45 miles from Portland, Ore. F. A. Mabee, who is interested in the mines, is in the East, with a view to purchasing a smelting plant.

The Rail Specifications.

During the past week there was submitted to the full committee of the American Railway Association and the steel companies the report of the subcommittee of eight. It is understood that the steel companies are a unit, but that the railroad interests are divided, the majority, however, being agreed in demanding that the phosphorus contents shall not exceed 0.085 per cent. The majority of the railroad representatives persist in their demand for a 25 per cent. discard. So far as the maximum limit of 0.085 per cent. of phosphorus in Bessemer steel rails is concerned, the mills take the ground that even the tonnage of rails required for mere renewals is so large and the supply of low phosphorus rails is so limited that it will be physically impossible to turn out the tonnage. While it is true that this question does not concern the mills making open hearth rails, their output for the coming year is too small to affect the situation.

As to the discard, that is, of course, a question of price, and while this has not yet been officially considered, the attitude of the railroads has apparently been sounded sufficiently to create the feeling in steel circles that there is little chance of the interests coming together in the near future.

The semiannual meeting of the American Railway Association is to be held in this city October 30, when the Committee on Rail Specifications, appointed at the last annual meeting at Chicago, will report. Until that time no information concerning the report is available from official sources.

The No. 2 stack of the Dunbar Furnace Company, Dunbar, Pa., for the week ending September 28, used only 1993 lb. of coke per ton of pig iron. This stack is using Semet-Solvay byproduct coke exclusively for fuel, and about 86 per cent. soft and 14 per cent. hard Lake Superior ores from the Cleveland-Cliffs Iron Company's mines. The average silicon on the 42 casts of iron was 1.60 per cent., and average sulphur 0.039 per cent. The furnace makes foundry, forge, basic, car wheel and malleable irons.

The Railway Club of Pittsburgh made a visit of inspection September 27 to the Homestead Works of the Carnegie Steel Company and the McKeesport Works of the National Tube Company. In the evening the regular monthly meeting was held, at which J. Kent Smith, chief metallurgist of the American Vanadium Company, read a paper, entitled "Vanadium Steel."

In awarding contracts for supplying Admiral Evans' fleet with coal, the Bureau of Equipment has been directed by President Roosevelt to accept all bids of coal companies in the United States which do not exceed the foreign bids by more than 50 per cent. The total of the American offers amounts to only 25 per cent. of the supply needed, so that if all American bids are accepted 75 per cent. will have to be supplied by foreigners.

The Inland Waterways Commission appointed by President Roosevelt, with Congressman Burton of Cleveland

as chairman, reached Duluth last week after a trip up the lakes. From Duluth the commission proceeded down the Mississippi Valley.

Iron and Industrial Stocks.

NEW YORK, October 2, 1907.

The stock market is still under pressure, and quite a number of the industrial stocks have shown a further decline. Last week the copper stocks were the leaders in this respect, but since then the railroad stocks and some of the iron and steel stocks have assumed the lead in the downward trend. Active stocks have shown the following range of prices from Thursday of last week to Tuesday of this week, the higher price named having usually been realized on Thursday: United States Steel common 26 $\frac{1}{2}$ to 28 $\frac{1}{4}$, preferred 87 $\frac{1}{2}$ to 90 $\frac{1}{2}$; Car & Foundry common 36 to 38, preferred 92 to 94 $\frac{1}{2}$; Locomotive common 50 $\frac{1}{2}$ to 52 $\frac{1}{4}$; preferred 99 $\frac{1}{2}$ to 100 $\frac{1}{2}$ ex. dividend; Steel Foundries preferred 34 to 36; Colorado Fuel 17 $\frac{1}{4}$ to 22 $\frac{1}{2}$; Pressed Steel common 25 $\frac{1}{2}$ to 26 $\frac{1}{2}$, preferred 83; Railway Spring common 35 $\frac{1}{2}$ to 36 $\frac{1}{2}$; Republic common 19 $\frac{1}{2}$ to 20 $\frac{1}{2}$, preferred 71 to 73; Sloss-Sheffield common 44 to 47 $\frac{1}{4}$; Cast Iron Pipe common 28 $\frac{1}{2}$ to 30 $\frac{1}{2}$; Can preferred 48 $\frac{1}{2}$ to 48 $\frac{3}{4}$. Last transactions up to 1.30 p. m. to-day are reported at the following prices: United States Steel common 26 $\frac{1}{2}$, preferred 88 $\frac{1}{2}$; Car & Foundry common 37, preferred 94; Locomotive common 52, preferred 100; Steel Foundries 6 $\frac{1}{2}$, preferred 36; Colorado Fuel 19 $\frac{1}{2}$; Pressed Steel common 26, preferred 84 $\frac{1}{2}$; Railway Spring common 35 $\frac{1}{2}$; Republic common 20 $\frac{1}{2}$, preferred 73 $\frac{1}{2}$; Sloss-Sheffield common 44 $\frac{1}{2}$; Tennessee Coal 135; Cast Iron Pipe common 30, preferred 79; Can common 4 $\frac{1}{2}$, preferred 48 $\frac{1}{2}$.

The annual meeting of the American Steel Foundries in Jersey City, October 1, resulted in the indorsement of the management. The nature of the bonus given to the officers of the company was explained in detail by Judge Elbert H. Gary, who is a director of the company, and he further stated that he believed it would be only a short time until the company would be able to resume the payment of dividends on the preferred stock. Meanwhile, he said, with the steel business showing signs of a reaction, he thought it the part of wisdom to be conservative. As a concession to the dissatisfied minority stockholders he proposed that a committee of not more than five, and no less than three, be appointed by the chairman, with the minority represented, to confer with the directors of the company on the dividend question, giving them the power to employ auditors. The following directors, candidates of the management, were elected to fill vacancies: W. W. Butler, E. F. Goltra, W. P. Sargent, Arthur J. Eddy and Morris Backman, the latter being the only new director. The annual report and balance sheet were approved.

The stockholders of the Allis-Chalmers Company who gathered in Jersey City September 26 to attend the postponed annual meeting were disappointed by a further adjournment to October 23. Officers of the company explained that it would be impossible to get a quorum. The managers of the company state, however, that this second postponement of the meeting was not due to a desire on the part of the management and directors to conceal satisfactory developments as it is known that a plan for strengthening the company's financial position now is being worked out and that other matters relating to the company's management are in course of settlement. It is understood that the earnings of the company for the first quarter of the fiscal year will show that the turning point in its finances has been reached and that better results are being recorded.

Bearing upon Wall Street rumors regarding the Colorado Fuel & Iron Company accompanying the heavy break in the price of the stock, which on Monday sold as low at 17 $\frac{1}{4}$, the following semiofficial statement has been made: "The Colorado Fuel & Iron Company is in better condition, physically and financially, than it ever has been. It has no floating debt and has good cash balances in the banks. The decline in its securities is merely in sympathy with the heavy price losses in the general market. The company is not only earning all its fixed charges of every kind and character, but is carrying a surplus to the credit of profit and loss monthly of \$50,000 to \$75,000. It has orders on its books in the manufacturing department that will keep it actively employed for at least a year to come."

Dividends.—The Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., has declared a quarterly dividend of 2 $\frac{1}{2}$ per cent. on the preferred, assenting and nonassenting stock, payable October 10.

The E. W. Bliss Company, Brooklyn, N. Y., has declared a quarterly dividend of 2 $\frac{1}{2}$ per cent. on the common stock and 2 per cent. on the preferred stock.

The National Fireproofing Company, Pittsburgh, Pa., has declared a quarterly dividend of 1 per cent. on the preferred stock, payable October 15.

The Tuthill Spring Company, Chicago, Ill., has declared the regular annual dividend of 10 per cent.

NEWS OF THE WORKS.

Iron and Steel.

The blast furnace of the Union Iron & Steel Company, at Ironton, Ohio, has been undergoing repairs and is still idle. It was blown out August 5. The furnace is in charge of Charles Peters, receiver, who was superintendent of the Ironton division of the Union Iron & Steel Company.

Preparations are being made to start up the puddle mill of Howe & Samuel at Danville, Pa., which has been idle since June. The plant may start early in October.

The Pennsylvania Steel Company has blown in No. 1 furnace at Steelton, Pa., which had been idle for repairs.

The Southern Steel Company, Birmingham, Ala., has shut down its Rising Fawn Furnace, Ga., on account of a defect in the water supply.

It was the intention of the Warwick Iron Company, Pottstown, Pa., to blow out its No. 1 furnace a week ago, but on account of the pressure to deliver certain grades of iron its blowing out has been postponed until the company's order books are in better shape. The furnace, which has been in operation several years, will probably have to stay in until December.

The Nittany Iron Company, Bellefonte, Pa., has reopened the ore fields in Union County near the old furnace at Gleniron.

Furnace No. 3 of the Carrie group of the Carnegie Steel Company was blown out recently for relining for the first time in over six years, the stack having been in operation on the same lining since February 25, 1901.

No. 4 furnace of the Shenango Furnace Company, Sharpsville, Pa., has been blown in after being idle only 14½ days for relining from the mantle up.

All the blast furnaces of the Republic Iron & Steel Company in the two valleys are now in blast, Hannah Furnace, at Hazelton, which was shut down recently for repairs, having been started last week. A new 21 x 80 ft. stove was added to the stack and its capacity was considerably increased.

General Machinery.

L. J. Wiltsea, formerly with the C. J. Palmer Company and for the past three years with the Ingle Machine Company, has taken the management of the J. Emory Jones Estate, operating the Eagle Foundry & Machine Shop, Rochester, N. Y. The plant is equipped for making the best quality of machine castings, for doing machine work, for making all ordinary forgings and for pattern making. In connection with the pattern shop there are over \$20,000 worth of general patterns on hand. An engineering department will also be maintained for the benefit of customers.

The J. C. Prims Machinery Company, Battle Creek, Mich., designer and builder of special machinery, has increased its capital stock from \$10,000 to \$15,000.

The Crescent Marine Engineering Company, 80 Broad street, New York, machinist, boiler maker, &c., with works at the foot of Twenty-sixth and Twenty-seventh streets, Brooklyn, N. Y., has incorporated. Louis L. Bernies is treasurer.

The Parkersburg Machine Company, Parkersburg, W. Va., has taken over the business of the Oil Producers Mfg. & Supply Company of St. Marys, W. Va.

The Henry Martin Brick Machine Company, Lancaster, Pa., has begun the reconstruction of the buildings of its plant which were recently burned.

Power Plant Equipment.

The Wisconsin Engine Company, Corliss, Wis., manufacturer of Corliss engines, will soon erect two new buildings at its plant, plans for which have already been prepared. A pattern shop, 40 x 160 ft., and a storage building, 100 x 220 ft., will be built, both being of concrete and brick construction.

The Keller Steam Economizer Company, Joplin, Mo., recently incorporated to manufacture the Keller feed water heater, will install a plant about 65 x 100 ft., to be equipped with modern machinery, the entire installation to cost about \$7500.

The Seaboard Portland Cement Company, Alsen, N. Y., which is equipping a large cement plant with the most modern machinery and appliances, has contracted with the Rust Boiler Company, Pittsburgh, Pa., for six 608-hp. Rust water tube boilers.

The B. F. Sturtevant Company, Hyde Park, Mass., reports the following sales of electric generating sets, which are reported by F. R. Chincock of the electrical department from its New York office: Benj. Hitchings, Brooklyn, N. Y., one 9 x 8 in. vertical engine, 22½ kw. generator; David Rodgers Company, Paterson, N. J., 13 x 12 in. horizontal engine, 50-kw. generator; International Paper Company, New York, 5 x 5 in. vertical engine, 6-kw. generator; Chas. E. Ring & Co., Brooklyn, N. Y., 9 x 9 in. vertical engine, 30-kw. generator, and 14 x 14 in. horizontal engine, 75-kw. generator; Peter Hauck Brewing Company, Harrison, N. J., 13 x 13 in. horizontal engine, 50-kw. generator; Chas. Hakemeyer Company, Paterson, N. J., 17½-kw. generator; Bedford Reformatory for Women, Bedford, N. Y., 13 x 12 in. horizontal engine, 50-kw. generator; Department of Docks and Ferries, New York, 14 9 x 8 in. vertical engines, 30-kw. generators; J. G. White & Co., New York, two 3½ x 3 in. vertical engines, 3-kw. generators; American Sapphire Company, Colorado, 7 x 7 in.

vertical engine, 15-kw. generator; Chrome Steel Company, Chrome, N. J., 3½ x 3 in. vertical engine, 3-kw. generator; American Can Company, Lubeck, Me., 13 x 12 in. horizontal engine, 50-kw. generator, 10-hp. motor, and 15-hp. motor; Wm. Sheehan & Co., New York; 11 x 10 in. horizontal engine; H. Wales Lines Company, Meriden, Conn., 11 x 10 in. horizontal engine, 30-kw. generator, 7 x 7 in. vertical engine, 15-kw. generator; Eagle Brewing Company, Newark, N. J., 11 x 10 in. horizontal engine, 40-kw. generator; Jas. Shewan & Sons, New York, four 7 x 7 in. vertical engines, 25-kw. generators; Vulcan Detting Company, Sewaren, N. J., 7 x 7 in. vertical engine; Tintern Manor Water Company, Redbank, N. J., 4½ x 4½ in. vertical engine, 5-kw. generator, 6 x 5 in. vertical engine, 7-kw. generator; Hudson Companies, Jersey City, N. J., three 10 x 18 x 10 in. vertical cross compound engines with 100-kw. generators, one 8 x 14 x 8 in. vertical engine, 50-kw. generator, two 8 x 14 x 8 in. vertical engines, 50-kw. generators, two 12 x 10 in. vertical engines, 50-kw. generators.

Bids will be received at the office of the President of the Borough of the Bronx, 177th street and Third avenue, New York, on October 10, for furnishing 40 hp. of boilers and pumps and necessary fittings to take the water from a storm relief tunnel at Inwood avenue.

The Luitwieler Pumping Engine Company, Los Angeles, Cal., is negotiating with several points in the East with a view of establishing an extensive plant in the near future. The company's growing business demands manufacturing facilities in the Eastern part of the country, and it hopes soon to be able to select a location.

Foundries.

The National Casting Company, recently incorporated at Milwaukee, Wis., is organized to make small castings peculiar to cash registers and adding machines. These castings are accurately done in steel molds of a tough metal which is patented by the company. Plans are now being made for a large and modern foundry and machine shop. Edward Shallock is secretary.

T. Harold Townsend, Waterville, N. Y., has started to rebuild his foundry, which was recently destroyed by fire.

The Prime Steel Company, Milwaukee, Wis., which operates a foundry in the southern part of the city, has recently increased its capital stock from \$15,000 to \$50,000.

The Contractor's Casting & Machine Company, Buffalo, N. Y., is erecting in addition to the building mentioned in these columns last week a new pattern shop and stockroom, 14 ft. square: cooling and chipping room, 40 x 80 ft., and a storehouse, 20 x 40 ft. The output of the works is now 20 tons per day, which will be increased within two months to 60 tons per day, which are required to fill present orders. The main building, now in course of erection, will be used for the manufacture of pile castings for the Pennsylvania tunnels now building around New York, and the equipment required for this work is of special character.

The Chappell Furnace Company, Morenci, Mich., will move to Huntington, Ind., where its capital stock will be increased to \$30,000 by a subscription of \$20,000 by Huntington business men. The name of the company will be changed to the Majestic Furnace & Foundry Company. A plant will be erected to include a foundry and machine shop.

The United States Radiator & Boiler Company, West Newton, Pa., has not yet decided on a plan for rebuilding its foundry, which was recently destroyed by fire, nor has it ascertained the amount of machinery it will require. The company is now using another foundry which had been idle for some time.

Fires.

The plant of the American Mfg. Company, Sheboygan, Wis., was burned September 23, the loss being about \$40,000.

The plant of the American Steel Package Company, Defiance, Ohio, was damaged \$20,000 by fire September 23.

Fire, September 27, destroyed the tipple, engine and boiler houses, blacksmith shop and fan house of the Knox Coal Company at Bicknell, Ind. Among the machinery wrecked was a dynamo and engine, hoisting machinery and mining machinery valued at \$15,000. The total loss is about \$30,000.

The plant of the Illinois Brick Mfg. Company, Hammond, Ind., was burned September 26. The loss is placed at \$75,000, fully covered by insurance.

The plant of the Orange Grove Brick & Tile Company, Orange Grove, Miss., was burned September 26, the loss being about \$18,000.

Hardware.

During the past year the Kansas City Bolt & Nut Company, Kansas City, Mo., has installed an 18 and 10 in. tandem train of rolls, with two heating furnaces. It has also completed a new machine shop with an enlarged complement of tools, and has added materially to its bolt and nut department, so that its capacity has been practically doubled.

The Imperial Bit & Snap Company, Racine, Wis., formerly a firm of L. J. Elliott and John Reichert, has been incorporated with a capital of \$100,000.

The Owensboro Shovel & Tool Company, manufacturer of scoops, shovels, spades and hoes, Owensboro, Ky., has increased

its facilities for shovel making to a capacity of about 150 dozen per day. The company's main shop is 76 x 300 ft., and is fully equipped with the most approved machinery. The company has added a handle factory, 50 x 100 ft., in which all of its wood D shovel handles, long shovel handles and hoe handles are manufactured. Two new 150-hp. boilers and a 200-hp. engine have been installed, and a warehouse, 35 x 100 ft., two stories high, has just been completed.

The Best Light Company, manufacturer of the Best Incandescent vapor gas lamps, street lamps for gas, gasoline and kerosene, gasoline burners, fixtures, valves, &c., is building an addition to its plant which will permit the company to increase its output considerably. Business for 1907 has thus far exceeded the company's expectations and shows a very large increase over that of last year.

The Capitol Lock-Nut & Washer Company, Columbus, Ohio, will soon have completed a large addition to its plant. It will be used largely for warehouse purposes, which will relieve the congestion in the present building.

Beall Bros., Alton, Ill., manufacturers of shovels, miners' tools and supplies, &c., state that their plant is running to fullest capacity to keep up with the business offered. In the heavy hammer and railroad track tool factory it has even been necessary to refuse orders, a condition which is unusual at this season of the year.

MISCELLANEOUS.

The Loring Auto Appliance Company, New York, has been incorporated as a selling branch for the Loring speed gauge for automobiles and electric cars, which has been on the market for two years and which is manufactured at Somerville, Mass. W. M. Inge is president; F. J. Dorlan, vice-president and treasurer, and Eugene Inge, secretary.

The Hamburg Mfg. Company, Hamburg, Pa., has incorporated with a capital stock of \$50,000 to manufacture the New Century chain hoist, and is making arrangements to equip a plant with the latest improved machinery. The company has already received a large number of orders for this hoist. Henry J. Schmick is interested.

The stockholders of the George A. Ray Mfg. Company, Buffalo, N. Y., manufacturer of copper, brass and plated goods, are interested in the newly organized Buffalo Copper & Brass Rolling Mill, which is erecting a copper mill in Buffalo and to which reference has been made in these columns before. The new mill will be in operation the coming year.

The Mt. Pleasant Tool Company, Mt. Pleasant, Pa., has filed a debt increase of \$25,000 for extensions and business.

Jno. H. Cowles & Co. have succeeded to the business of Haight & Co., Louisville, Ky., manufacturers of brass castings and silver, nickel and copper plating and polishing and lacquering. The new firm, which consists of Jno. H. Cowles and Edward H. Stevens, will continue to do the same high quality of work as did the old firm.

The Ross Supply Company, Anderson, Ind., manufacturer of windmills and well supplies, has moved to Greenville, Ohio.

The National Supply & Machinery Dealers' Association.

President George Puchta of the National Supply & Machinery Dealers' Association, has called the semi-annual meeting of the Executive Committee, which will be held at the Hotel Imperial, New York, October 14 and 15. The Machinery Committee will meet to confer with a committee of the National Machine Tool Builders' Association, consisting of I. H. Johnson, Jr., I. H. Johnson, Jr., & Co., Philadelphia; Herbert L. Flather, Flather & Co., Inc., Nashua, N. H., and Charles F. Hilker, Hamilton Machine Tool Company, Hamilton, Ohio. This meeting will be held on the day preceding the annual meeting of the National Machine Tool Builders' Association, also at Hotel Imperial, October 15 and 16. The conference will consider a uniform contract of sale between the manufacturer and dealer in machinery, exclusive territorial rights and other matters of mutual interest to the two branches of the business.

It is probable that representatives of the American Supply & Machinery Manufacturers' Association and the Southern Supply & Machinery Dealers' Association will be present at one of the meetings of the Executive Committee to consider whether the next annual meeting in May, 1908, shall be a joint meeting, similar to that held in Cincinnati, making provision for the full consideration of matters pertaining to machinery interests, and at what place the annual meeting shall be held.

The Ella Furnace of Pickands, Mather & Co., at West Middlesex, Pa., which was blown out for repairs August 7, again went into blast September 24.

Recent Customs Decisions.

In a decision by I. F. Fischer, the Board of United States General Appraisers September 27 sustained a protest made by the Joseph F. McCoy Company and others, New York, against the inclusion of an additional duty of 1 cent per pound on cold rolled steel strips. It was maintained by the litigants that the strips are not finished in a manner calling for the extra rate. This contention is upheld by the tribunal.

Several claims filed by Lunham & Moore, New York, regarding the classification of old pieces of block tin were overruled by the Board of Appraisers September 28. The merchandise was returned by the appraiser for duty as "old white metal scrap fit only for remanufacture," with duty at the rate of 20 per cent. Among the allegations made by the importers for lower classification are that the goods are dutiable as old pewter, or britannia metal, as old junk, or as block tin. It was brought out at the trial that the articles were used formerly as covers for ammunition cans. General Appraiser Fischer, who writes the decision, says that the importers' claim for duty under the junk provision of the tariff would have received consideration from the board had evidence been offered to show that the article in question is uniformly and generally recognized and dealt in as junk. The reviewing officer adds that the testimony is insufficient to establish the commercial designation of the covers as junk. The decision states that the merchandise might be held dutiable at 10 per cent. as "waste not specially provided for," but as this claim is not made the board cannot pass upon the question.

The Chester Forging & Engineering Company.

The Chester Forging & Engineering Company, Chester, Pa., a recently formed corporation, whose finishing plant has been temporarily located at Ninth and Crosby streets in that city, has purchased from the American Conduit Company a 4-acre tract of land located in the southern section of the city along the Pennsylvania Railroad. A large manufacturing building is already on the site, and additions will be made so that at least five hammers can be installed for forging purposes. Additional buildings will be erected to accommodate the machine and finishing departments, for which an extensive equipment has already been ordered, while special tools for handling crank shafts have been designed, and are now being built in the company's own shops. A. P. Witteman of A. P. Witteman & Co., iron and steel merchants and manufacturers, Philadelphia, is president; S. S. Thompkins, Chester, secretary and treasurer, and H. P. Arnold, Eddystone, Pa., vice-president and general manager. Active work will be started on the new plant at once, so that the work of producing forgings in the rough, as well as finished, can be started as soon as possible.

The directors of the Youngstown Sheet & Tube Company, Youngstown, Ohio, have re-elected former officials as follows: James A. Campbell, president; H. G. Dalton of Cleveland, first vice-president; Charles S. Robinson, second vice-president and general manager; George E. Day, secretary; Richard Garlick, treasurer; W. D. Jones, auditor. This company is now building two blast furnaces, each to have a daily capacity of 500 tons, and which will be making iron early next year. It also proposes to build metal mixers and use hot metal in the steel plant, after these furnaces have been completed. When the two stacks now under way are finished two more stacks will be started, these having been authorized by the board some time ago.

The J. W. Cooper Company has been incorporated at Buffalo, N. Y., with a capital stock of \$20,000, to manufacture machinery and engines, principally a triple expansion engine patented by Jno. W. Cooper, manager of the company. Factory premises have not yet been secured, but are being arranged for. The present office of the company is at 509 Brisbane Building.

The Iron and Metal Trades

Reports of the closing down of Steel works, apparently started with an object, should be received with reserve. An instance of these false statements has cropped up this week, which dealt with stoppages at Edgar Thomson and Homestead. As a matter of fact, the Edgar Thomson, Homestead and Duquesne works of the Carnegie Steel Company are in full operation.

There has been little movement in the Pig Iron markets. Bessemer, in the Central West, is firm, and is expected to be scarce for the balance of the year, on account of scarcity of suitable Ores. Foundry Irons, however, are weaker, the furnaces using Lake Ores finding some relief in that direction. East of the Allegheny Mountains the market is fairly steady, but with more than the usual pressure to market misfit Iron and off grades. Southern makers while recognizing the downward tendency see no motive for cutting prices since they are well booked to the end of the year and the stocks are very light.

Steel is easier in the Central West and Pittsburgh now quotes \$28.50 for Bessemer and \$30.50 for Open Hearth Billets. Reported sales for export are incorrect. There has, however, some business been done in Steel Rails for export. A part of the first installment of the new orders for the Manchurian railroads, amounting to 12,000 tons, has been taken by the Steel Corporation; the balance is still under negotiation. In all the new requirements for the Manchurian lines are about 70,000 tons.

The September bookings of fabricated material by the American Bridge Company, foot up 33,000 tons, as compared with 53,000 tons in August, outside interests taking a larger proportion. It is estimated that the total tonnage placed in September is between 120,000 and 125,000 tons. During the past week a good run of contracts has been placed, the aggregate being about 15,000 tons, mostly railroad work. It is estimated that there is to be closed, in the Mississippi Valley, in the next four months railroad work aggregating 30,000 tons, and that an equal amount is in sight for buildings. On the other hand, it is announced that the contract for 11,000 tons for the new Oliver Building at Pittsburgh has been postponed.

The Lake shipbuilders have secured three additional boats, with one more about to be let.

Western thresher manufacturers have contracted for a large quantity of Seamless Tubes for the season's requirements. It is stated that the quantity was as large as it was last year.

In the Wire trade the principal item of news is that the leading company has sold 26,000 tons of Wire for shipment to Canada.

Bids have been opened in Cuba for two lots of Cast Iron Water Pipe aggregating 15,000 tons. It is estimated that other municipalities in the island will need about 30,000 tons more.

It is difficult to get at the quantity of business being done in the domestic market in Copper. It is known that some sales have been made around 15c. for Electrolytic. Sales for shipment abroad have taken place at the range of 14½c. to 14¾c. The exports of Copper during September were 17,157 tons, an encouraging exhibit.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

Oct. 2, Sept. 25, Sept. 4, Sept. 5,

1907. 1907. 1907. 1906.

PIG IRON , Per Gross Ton :				
Foundry No. 2, Standard, Philadelphia	.....	\$20.00	\$20.25	\$21.00 \$20.25
Foundry No. 2, Southern, Cincinnati	.....	21.25	21.75	21.75 18.50
Foundry No. 2, Local, Chicago	.....	22.50	22.50	24.50 19.75
Bessemer, Pittsburgh	.....	22.90	22.90	22.90 19.35
Gray Forge, Pittsburgh	.....	20.40	20.90	21.40 18.35
Lake Superior Charcoal, Chicago	.....	26.50	26.50	27.00 20.00

BILLETS, &c., Per Gross Ton :

Bessemer Billets, Pittsburgh	.....	28.50	29.50	29.00 28.00
Forging Billets, Pittsburgh	.....	32.00	33.00	33.00 34.00
Open Hearth Billets, Phila.	.....	31.00	31.00	31.50 30.00
Wire Rods, Pittsburgh	.....	36.00	36.00	36.00 34.00
Steel Rails, Heavy, Eastern Mill	.....	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton :

Steel Rails, Melting, Chicago	.....	17.00	17.00	17.00 16.50
Steel Rails, Melting, Phila.	.....	16.50	16.75	16.75 18.00
Iron Rails, Chicago	.....	20.25	20.25	20.25 23.50
Iron Rails, Philadelphia	.....	20.50	20.50	20.50 24.00
Car Wheels, Chicago	.....	24.00	24.50	24.50 20.00
Car Wheels, Philadelphia	.....	23.00	23.00	23.00 17.50
Heavy Steel Scrap, Pittsburgh	.....	17.50	17.00	17.75 16.75
Heavy Steel Scrap, Chicago	.....	15.00	14.75	14.75 16.50
Heavy Steel Scrap, Philadelphia	.....	16.25	16.50	16.50 17.75

FINISHED IRON AND STEEL,

Per Pound :	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	1.75	1.75	1.85	1.63½
Common Iron Bars, Chicago	1.78	1.78	1.78	1.71½
Common Iron Bars, Pittsburgh	1.70	1.70	1.70	1.50
Steel Bars, Tidewater, New York	1.81	1.81	1.86	1.64½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater, New York	1.86	1.86	1.86	1.74½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.60
Beams, Tidewater, New York	1.86	1.86	1.86	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.86	1.86	1.86	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.85	1.85	1.85	1.57½
Skelp, Sheared Steel, Pittsburgh	1.95	1.95	1.95	1.60

SHEETS, NAILS AND WIRE,

Per Pound :	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.50	2.50	2.50	2.40
Wire Nails, Pittsburgh	2.05	2.05	2.05	1.85
Cut Nails, Pittsburgh	2.10	2.10	2.10	1.75
Barb Wire, Galv., Pittsburgh	2.50	2.50	2.50	2.35

METALS, Per Pound :

	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	15.00	15.00	18.12½	18.87½
Electrolytic Copper, New York	14.75	14.75	17.50	20.50
Spelter, New York	5.40	5.25	5.50	6.10
Spelter, St. Louis	5.20	5.15	5.37½	5.90
Lead, New York	4.68	4.75	5.12½	5.85
Lead, St. Louis	4.52	4.55	4.95	5.75
Tin, New York	34.70	37.15	37.12½	40.60
Antimony, Hallett, New York	11.00	11.00	9.00	24.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York	\$4.00	\$4.00	\$4.09	\$3.94

Chicago.

FISHER BUILDING, October 2, 1907.—(By Telegraph.)

The booking of 7000 tons of Rails last week by the Illinois Steel Company is regarded as a forerunner of orders that are expected to follow the conclusion of conferences in progress between the railroad and mill interests on the question of shapes and specifications. Outside of a 1000-ton order for guard Section Rails, placed with the Lorain Steel Company, for use in the reconstruction of Chicago's street railroad system, there is nothing doing in traction Rails. There are plenty of projects for interurban railroad construction in hand, but it is impossible to get money to carry them through. While business in Structural Shapes has fallen off, there is a large amount of tonnage involved in plans, which are confidently expected to result in business at no distant date. The announcement that the Corn Products Company is arranging to go ahead with its plans for the building of a \$5,000,000 plant at Summit, Ill., gives promise of 10,000 tons of Structural Shapes, which will, it is expected, soon engage the attention of fabricators. In mill products, business in all lines, though somewhat reduced in volume, is generally fair. The demand for Pig Iron shows no improvement. Buyers still decline to make commitments beyond actual needs at present price levels. From the limited tonnage moving it is evident that the wants to be supplied are not extensive. Recent sales of Copper in this market, covering consumers' requirements through the entire last quarter, would indicate a growing belief that the limit of recession had for the present been reached.

This opinion finds support perhaps in the greater firmness noticed in other metals.

Pig Iron.—Desultory buying of small lots for nearby requirements represents the measure of market activities. Whether due to overanticipation in purchases for third and fourth quarter needs or to a reduction in the melt, the fact remains that buyers have thus far been able to maintain an attitude of indifference. What few inquiries there are in the market concern tonnages of inconsiderable amount and deliveries this side of the new year. Malleable Bessemer is almost wholly neglected, there being practically no demand for it. As a result prices are decidedly easier on this grade, and for desirable fourth quarter tonnage \$22.50 can be done. For the same period the minimum on Southern No. 2 still holds at \$18, Birmingham, and for the first quarter \$17 is the nominal quotation. Shipments on contract Iron are coming forward with normal promptness, and no considerable amount of Iron is being piled in furnace yards either North or South. The fact that the market has withheld the pressure of protracted dullness with no greater loss of strength than is shown affords encouragement to the furnace interests. But beyond the first of the year no predictions are hazarded, nor is there any interest in deliveries that far ahead, except by an occasional buyer seeking to cover casting contracts. There is still a strong demand for Silvers, which are scarce and firm. The following prices are for October, November and December delivery, f.o.b. Chicago:

Lake Superior Charcoal	\$26.50 to \$27.00
Northern Coke Foundry, No. 1	23.00 to 23.50
Northern Coke Foundry, No. 2	22.50 to 23.00
Northern Coke Foundry, No. 3	22.00 to 22.50
Northern Scotch, No. 1	23.50 to 24.00
Ohio Strong Softeners, No. 1	23.00 to 23.50
Ohio Strong Softeners, No. 2	22.50 to 23.00
Southern Coke, No. 1	22.85 to 23.35
Southern Coke, No. 2	22.35 to 22.85
Southern Coke, No. 3	21.85 to 22.35
Southern Coke, No. 4	21.35 to 21.85
Southern Coke, No. 1 Soft	22.85 to 23.35
Southern Coke, No. 2 Soft	22.35 to 22.85
Southern Gray Forge	20.35 to 20.85
Southern Mottled	20.35 to 20.85
Malleable Bessemer	22.50 to 23.00
Standard Bessemer	23.90 to 24.40
Jackson Co. and Kentucky Silvery, 6 1/2	30.40 to 30.90
Jackson Co. and Kentucky Silvery, 8 1/2	32.40 to 32.90
Jackson Co. and Kentucky Silvery, 10 1/2	34.40 to 34.90

(By Mail.)

Billets and Rods.—As regards actual sales, the market has developed no further activity. Aside from a few orders for small lots no transactions are noted. One inquiry for 5000 tons of 4 x 4 in. Forging Billets, 1000 tons of which were wanted for quick delivery, appeared in the market during the week, but the prices offered failed to meet the views of the buyer. While better deliveries are being made on contracts, local mills are not actively seeking business. We quote Forging Billets at \$36 to \$38, Chicago; Wire Rods at \$37 to \$38, Pittsburgh.

Rails and Track Supplies.—Rail orders placed with the Illinois Steel Company by Western roads within the past week amounted to about 7000 tons, and 1000 tons of guard section Rails was added to the tonnage already placed by the Chicago City Railway Company with the Lorain Steel Company. Both Light Rails and Track Supplies are quiet, with a tendency toward easier prices on the latter. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.75c. to 1.85c.; Spikes, 2.10c. to 2.20c., according to delivery; Track Bolts, 2.60c. to 2.70c., base, Square Nuts, and 2.75c. to 2.85c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, \$34; 25-lb., \$35; 20-lb., \$36; 16-lb., \$37; 12-lb., \$38, f.o.b. mill. Standard Sections, \$28, f.o.b. mill, full freight to destination.

Structural Material.—With plenty of business pending, but little is being closed. Tight money and the hope of lower prices are doubtless both influential factors in delaying final action on many building projects now under way. At the same time no disposition is shown to abandon these plans, and negotiations on nearly all the important ones heretofore reported are still in progress. It is noteworthy in this connection that the Corn Products Refining Company is arranging to go ahead with its plans, which for some months have been held in abeyance, for the construction of a mammoth plant at Summit, Ill., near Chicago. About 10,000 tons of Structural Shapes will be required in this work, which it is expected will soon be up for figures. Prices from store are quoted without change, at 2.05c. to 2.10c., and mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.; Angles, 3 to 6 in., 1/2-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras.

Plates.—New tonnage is comparatively light, but Western mills are booked ahead with business sufficient to carry them well into next year. Improved shipments from a number of independent mills enable buyers to get reasonably prompt deliveries on desirable specifications. Orders for two new ships by the Steel Corporation interests include a total

tonnage of about 7500 tons, of which Plates will form a considerable part. We quote for future delivery as follows: Tank Plates, 1/4-in. and heavier, wider than 6 1/4 and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for 1/4-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, 1/4-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3-16 in. up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.50c. to 2.65c.; No. 8, up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

Sheets.—A moderate demand is reported and shipments on contracts continue heavy. While the principal producer is still delinquent in deliveries, some of the outside mills are actively seeking business, and as a result slight concessions have been offered on Galvanized Sheets. On the whole, however, prices on both Black and Galvanized are fairly well maintained. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 2.08c.; No. 12, 2.08c.; No. 14, 2.13c.; No. 16, 2.23c.; Box Annealed, Nos. 17 to 21, 2.53c.; Nos. 22 to 24, 2.58c.; Nos. 25 to 26, 2.63c.; No. 27, 2.68c.; No. 28, 2.78c.; No. 29, 2.88c.; No. 30, 2.98c.; Galvanized Sheets, Nos. 10 to 14, 2.83c.; Nos. 15 and 16, 3.03c.; Nos. 17 to 21, 3.18c.; Nos. 22 to 24, 3.33c.; Nos. 25 and 26, 3.53c.; No. 27, 3.73c.; No. 28, 3.93c.; No. 30, 4.43c. Sheets from store: Blue Annealed, No. 10, 2.40c.; No. 12, 2.45c.; No. 14, 2.50c.; No. 16, 2.60c.; Box Annealed, Nos. 18 to 21, 2.70c.; Nos. 22 to 24, 2.75c.; Nos. 26, 2.80c.; No. 27, 2.85c.; No. 28, 2.95c.; No. 30, 3.35c.; Galvanized from store: Nos. 10 to 20, 3.20c. to 3.30c.; Nos. 22 to 24, 3.55c. to 3.60c.; No. 26, 3.65c. to 3.70c.; No. 27, 3.85c. to 3.95c.; No. 28, 4.15c.; No. 30, 4.65c. to 4.70c.

Bars.—For strength and sustained demand, Steel Bars seem to lead all other mill products. Besides a considerable tonnage of new business booked during the week, specifications are offered far in advance of requirements. Bar Iron, though not in so great demand, is fairly active, and holds firm at current quotations. Quotations, Chicago, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.78c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—With increasing betterment in shipments, due to the progress being made in the gradual clearance of mill congestion, many of the difficulties encountered in the movement of Pipe are disappearing. The amount of new business coming in, though aggregating a considerable tonnage, falls short of outgoing shipments. Prices are reported to be steady at current quotations on both Steel and Iron Pipe. The following mill discounts are quoted: Black Pipe, 3/4 to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, 3/4 to 6 in., 61.2. These discounts are subject to 1 point on the base. From store in small lots Chicago jobbers quote 68 per cent. on Black Steel Pipe, 3/4 to 6 in. About 4 points advance above these prices is asked for Iron Pipe.

Boiler Tubes.—Merchant Tubes continue in fair demand, but it is noted that the requirements of boiler builders are somewhat diminished, especially on stock orders. Contracts were closed last week for a large tonnage of Seamless Tubes, representing the season's requirements of Western thresher engine builders. These were said to equal in amount those of last year. Mill quotations for future delivery on the base sizes are as follows: 2 1/2 to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2 1/2 in. and smaller, and lengths over 18 ft., and 2 1/2 in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1 1/2 in.	.35	.35	.35
1 1/2 to 2 1/4 in.	.50	.35	.35
2 1/2 in.	.52 1/2	.35	.35
2 1/2 to 5 in.	.60	.47 1/2	.47 1/2
6 in. and larger	.50	.35	.35

Merchant Steel.—A little better demand for Merchant Steel developed during the week, which appeared in orders ranging from 100 to 200 tons. No hesitancy in specifications on contracts is shown. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish, up to 1 1/2 x 1 1/2 in., 1.93c.; Iron Finish, 1 1/2 x 1 1/2 in. and larger, 1.78c., base; Channels for solid Rubber Tires, 3/4 to 1 in., 2.28c., and 1 1/8 in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46 1/2c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7 1/4c. to 8c., and still higher prices are asked on special grades. Shafting, 55 and 5 per cent. off in car lots; 55 per cent. less than car lots, Pittsburgh.

Cast Iron Pipe.—It is understood that although the contract has not been formally placed, the city of Columbus, Ohio, has decided to accept the lowest bid offered at the last letting for the 2500 tons required. Reflecting the downward

movement of Pig Iron, prices are a shade easier and quotations are accordingly revised. We quote, per net ton, Chicago, as follows: Water Pipe, 4-in., \$37; 6 to 12 in., \$36; 16-in. and up, \$35, with \$1 extra for Gas Pipe.

Coke.—Stimulated perhaps by the fear of delays in transportation, that may occur through inadequate car service later on, there is a fairly active contract demand for deliveries extending through the first quarter and half of next year. Prices are firm, at \$3.25 to \$3.50, oven, for 72-hr. Foundry Coke.

Old Material.—Notwithstanding the fact that the market is quiet and transactions involving important tonnage are few, a tendency toward greater firmness is observed. This is reflected in a shade of advance on a few mill grades, and is especially noticed in Rerolling Steel Rails, which are in demand. A sale of 5000 tons of the latter is reported at a price near \$18. An inquiry for another considerable tonnage is in the market, but prices so far offered have failed to meet the buyers' views. Car Wheels, which have held remarkably firm, are this week off 50 cents a ton under the pressure of freer offerings. There is a wide difference of opinion as to the future course of the market, but for the present at least it is without radical change in either direction. We quote, per gross ton, f.o.b. Chicago, as follows:

Old Iron Rails.....	\$20.25 to \$20.75
Old Steel Rails, rerolling.....	17.50 to 18.00
Old Steel Rails, less than 3 ft.....	17.00 to 18.00
Rerailing Rails, standard sections, subject to inspection.....	26.00 to 28.00
Old Car Wheels.....	24.00 to 24.50
Heavy Melting Steel Scrap.....	15.00 to 15.50
Frogs, Switches and Guards, cut apart.....	15.50 to 16.00
Mixed Steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron Fish Plates.....	\$17.00 to \$17.50
Iron Car Axles.....	23.50 to 24.00
Steel Car Axles.....	20.00 to 20.50
No. 1 Railroad Wrought.....	15.00 to 15.50
No. 2 Railroad Wrought.....	14.00 to 14.50
Railway Springs.....	14.50 to 15.00
Locomotive Tires, smooth.....	17.50 to 18.00
No. 1 Dealers' Forge.....	12.50 to 13.00
Mixed Busheling.....	10.50 to 11.00
Iron Axle Turnings.....	10.50 to 11.00
Soft Steel Axle Turnings.....	10.50 to 11.00
Machine Shop Turnings.....	10.50 to 11.00
Cast Borings.....	8.75 to 9.25
Mixed Borings, &c.....	8.50 to 9.00
No. 1 Mill.....	9.75 to 10.25
No. 2 Mill.....	8.75 to 9.25
No. 1 Boilers, cut to Sheets and Rings.....	10.50 to 11.00
No. 1 Cast Scrap.....	16.75 to 17.25
Stove Plate and Light Cast Scrap.....	14.00 to 14.50
Railroad Malleable.....	16.00 to 16.50
Agricultural Malleable.....	14.75 to 15.25
Pipes and Flues.....	11.25 to 11.75

Metals.—The feeling that the slump in Metals has spent its force, and a reasonably stable level has finally been reached, is evidenced by the more liberal buying which the past few days has developed. Local dealers report sales of round lots of Copper for deliveries extending in some instances through the final quarter. Spelter shows better strength and has reacted fractionally from the low point of a week ago. Altogether the situation is reassuring. We quote as follows: Casting Copper, 15 $\frac{1}{4}$ c.; Lake, 16 $\frac{1}{2}$ c. to 17c., in car lots for prompt shipment; small lots, 14c. to 9c. higher; Pig Tin, car lots, 38 $\frac{1}{4}$ c.; small lots, 38 $\frac{1}{2}$ c.; Lead, Desilverized, 5c. to 5.10c., for 50-ton lots; Corroding, 6c. to 6.10c., for 50-ton lots; in car lots, 2 $\frac{1}{4}$ c. per 100 lb. higher; Spelter, 5.45c.; Cookson's Antimony, 13 $\frac{1}{2}$ c., and other grades, 12 $\frac{1}{2}$ c. to 13c.; Sheet Zinc is \$7.50 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 13c.; Heavy Copper, 13c.; Copper Bottoms, 12c.; Copper Clips, 13c.; Red Brass, 12c.; Red Brass Borings, 10c.; Yellow Brass, 9c.; Yellow Brass Borings, 8c.; Light Brass, 6 $\frac{1}{2}$ c.; Lead Pipe, 3 $\frac{1}{2}$ c.; Tea Lead, 3 $\frac{1}{4}$ c.; Zinc, 3 $\frac{3}{4}$ c.; Pewter, No. 1, 22c.; Tin Foil, 27c.; Block Tin Pipe, 32c.

Birmingham.

BIRMINGHAM, ALA., September 30, 1907.

Pig Iron.—Little if any change has taken place in the Pig Iron market during the past week. Sales have been few, but the leading producers are apparently as determined as ever to make no concessions in price for the time being and are adhering to their former quotations of \$18.50 on a No. 2 Foundry basis. Some of the smaller furnaces are making lower prices, and there is still a quantity of resale Iron on the market which is being offered at a concession; in fact, the larger part of the recent business has been on resale Iron. As far as the lower grades of Iron are concerned there is no differential, each furnace selling at whatever price is necessary to move its accumulation. In several instances this is quite large, as the majority of the furnaces in the district are still working badly and the percentage of Soft Iron being produced is much below normal. Melters are showing no disposition to cover for requirements for fourth quarter, being satisfied to buy only what is necessary to keep them going for a week or a month at a time. Nothing is doing for 1908 delivery, and it is not expected that a

buying movement for that period will be started for at least a couple of months, as with the present outlook for business next year it would be absolutely impossible to have a shortage of Iron, and the melters have learned the danger of covering for their requirements so far in advance. Owing to the immense amount of equipment necessary to move the cotton crop cars are getting very scarce, and the furnaces are having difficulty in securing enough to move their product. For this reason some are predicting that spot Iron will again command a premium this winter.

Cast Iron Pipe.—Southern foundries are much interested in the lettings now being held in Cuba for Cast Iron Water Pipe. Bids were received on the 25th inst. for 8000 tons for Panaguey, Cuba, but at this writing the contract has not been awarded. On October 2 Havana will have a letting for about 7000 tons. In addition to this, it is understood that some 20 smaller towns will be in the market very shortly for a quantity aggregating about 30,000 tons. Inquiries for small lots are also said to be more numerous now than for several weeks and manufacturers are taking a much more optimistic view of the situation, many predicting that next year will be the best ever. Prices remain unchanged and are approximately as follows per net ton on Water Pipe, f.o.b. cars here: 4 to 6 in., \$32 to \$33; 8 to 12 in., \$31 to \$32; over 12 in., average \$30, with \$1 per ton extra for Gas Pipe. On large municipal contracts these prices are probably slightly shaded.

Old Material.—Dealers report a better feeling in the Scrap market, with increased buying. Consumers are again making contracts, though usually not for an extended period. Prices, it is thought, have about reached the bottom for a while and are now apparently on a basis satisfactory to all concerned. Dealers' quotations are about as follows per gross ton, f.o.b. yards here:

Old Iron Rails.....	\$22.00 to \$22.50
Old Iron Axles.....	18.50 to 19.00
Old Steel Axles.....	17.00 to 17.50
Old Car Wheels.....	20.50 to 21.00
No. 1 Railroad Wrought.....	17.50 to 18.00
No. 2 Railroad Wrought.....	12.50 to 13.00
No. 1 Country Wrought.....	14.50 to 15.00
No. 2 Country Wrought.....	11.50 to 12.00
Wrought Pipe and Flues.....	13.00 to 13.50
Railroad Malleable.....	14.00 to 14.50
No. 1 Steel.....	14.00 to 14.50
No. 1 Machinery Cast.....	15.50 to 16.00
Stove Plate and Light Cast.....	12.00 to 12.50
Cast Borings.....	8.25 to 8.75

Philadelphia.

PHILADELPHIA, PA., October 1, 1907.

To define the situation in the Iron and Steel market at this time with any degree of accuracy is a different proposition. A waiting policy has been largely adopted by both buyers and sellers, and while some business has been done, the transactions are largely characterized by individual conditions. Purchasers as a rule are placing orders for such materials as may be needed for their immediate or very near future requirements only, and buying has consequently been light. In some cases both foundries and mills are booked fairly well ahead and find specifications on old orders coming out pretty freely. In other instances, however, specifications are not coming out as promptly as might be desired. New business in small quantities comes out from day to day, and purchasers seem inclined to buy at the market rather than place orders for any large tonnage, so that they would be in a position to take advantage of any possible decline in prices. Under the circumstances, therefore, it is hard to estimate just what amount of new business will develop during the next three months, but it is more than likely that buying will be continued on the hand to mouth policy for some little time, or at least until there is more opportunity to size up the general situation. The crop situation continues favorable, and financial conditions appear to be a little more satisfactory, and should these factors continue to improve the general outlook would be materially benefited. There has been a falling off in the demand for machinery, tools, &c., and manufacturers in these lines are not satisfied with the outlook for business for the remainder of the year, but these industries have all been going at such a tremendous pace that some little let up will not be unwelcome. That the tonnage of raw materials required in the last quarter of the year will be less than that consumed in the previous quarters is admitted, but that the amount will fall off so much as to make any very extensive further decline in prices is still an open question, which time alone can tell. Generally speaking, prices are thought to be somewhere near the bottom, and both buyers and sellers appear to be willing to take hold at to-day's figures, although buyers are protecting themselves against the future by taking small lots only.

Pig Iron.—With the exception of a round lot of Basic Iron, sales of Pig Iron have not been very extensive. The tendency on the part of buyers seems to be toward conservatism, and orders are being placed only for such tonnages as are necessary to meet immediate requirements. Prices are still difficult to quote with accuracy. They lack firmness,

and while furnaces that have Iron to sell for the last quarter try to obtain the best price, there is little difficulty in obtaining Iron at the market, and in fact, there are cases where if a firm offer came out for a good tonnage there would probably be little difficulty experienced in obtaining some concession, it being dependent on who the customer was and how badly the business was needed. Under these conditions there is little tendency to buy for forward delivery, customers taking only enough to cover their needs from month to month, so that they will be in a position to take advantage of any lower prices should they develop. There is no doubt that there will be a falling off in the consumption of Pig Iron, and that there will also be a corresponding curtailment in production, but it remains to be seen whether the decreased production will equal the lessened consumption and thereby prevent any material falling off in prices. Quite a number of furnaces are badly in need of repairs and are only being maintained as producers on account of the contracts for high priced Iron still unfilled, but as rapidly as these are caught up with such furnaces will go out for repairs, and should prices be too low to warrant resumption they will no doubt remain in idleness until either prices get better or the cost of production is decreased. Foundry Irons have on the average been in better demand during the past week, and while sales have been confined to small lots, ranging from carloads to lots of 500 tons, the aggregate tonnage has been fairly good. Prices vary according to the quantity, customer and brand. Sales have been reported which range from \$20 to \$21 delivered, and some Irons are held even at higher figures. Virginia No. 2 X Foundry is reported as being held firmly at \$22, and No. 2 Plain at \$21.50, but no sales have been reported. There have been some further sales of Basic, one lot of 5000 tons for early delivery having been sold at close to \$18.50, which is said to be pretty nearly the best figure for which this Iron can be had at this time. Forge Irons are rather dull. There has been some inquiry but not a great deal of business. Sales are reported at \$18, but some of the off grades could probably be done for less. Low Phosphorus Iron has been inactive. There is not much of this Iron about, and what little is sold usually brings the full market price. Buyers show little disposition to take hold for next year's delivery. There has been some inquiry, but sellers are not anxious to quote and little business has been done. The range of prices for delivery in buyers' yards, eastern Pennsylvania and adjoining territory, for the remainder of the year, would be about as follows:

No. 2 X Foundry	\$20.00 to \$21.00
Gray Forge	18.00 to 18.75
Basic	18.50 to 19.00
Low Phosphorus	27.25 to 27.75

Ferromanganese.—There has been very little demand for Ferro the past week. Prices are quoted at about \$57 to \$58 for deliveries the remainder of this year, and \$55 to \$56 for delivery the first quarter of next year.

Steel.—Buyers are more disposed to get into the market, although the tendency is to place orders for small lots only. Several orders ranging up to 1000 tons have been placed the past week, and mills keep fairly well occupied. Prices for nearby deliveries are firm, at \$31 to \$32 for ordinary Rolling Steel and \$34.50 to \$35.50 for Forging Steel.

Plates.—There is practically no change in the demand for Plates. Buyers seem inclined to place business in small lots at the market, and orders covering from 100 to 400 tons have been taken at prices quoted. No large tonnages, however, have been offered. Specifications are coming out pretty freely and mills are operating on a fairly good tonnage. We quote prices as follows:

	Carload.	Part carload.
	Cents.	Cents.
Tank, Bridge and Boat Steel	1.85	1.90
Flange or Boiler Steel	1.95	2.05
Marine	2.20	2.25
Locomotive Firebox Steel	2.40	2.45
The above are base prices for $\frac{1}{4}$ -in. and heavier. The following extras apply:		
3-16-in. thick	\$0.10	
Nos. 7 and 8, B. W. G.	.15	
No. 9, B. W. G.	.25	
Plates over 100 to 110 in.	.05	
Plates over 110 to 115 in.	.10	
Plates over 115 to 120 in.	.15	
Plates over 120 to 125 in.	.25	
Plates over 125 to 130 in.	.50	
Plates over 130 in.	1.00	

Structural Material.—While there are no large propositions before the trade, orders for small lots of miscellaneous material are coming out fairly well and mills are kept pretty well occupied. Prices remain unchanged, 1.85c. to 2c. being quoted, according to specification.

Bars.—There is but little demand for Bars, and the market continues very dull. At the ruling quotation, 1.75c. to 1.80c., but little business is attracted, and mills are not very fully occupied. Steel Bars are quoted at 1.85c., Philadelphia, but prompt deliveries command a slight premium.

Sheets.—There is not much change in the demand for Sheets. A fairly good tonnage is being taken, from day to day for prompt delivery, while practically nothing is being done for the future. Prices for mill shipments are

as follows, a tenth extra being quoted for small lots: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

Old Material.—The market is inclined toward weakness. Buyers are not taking hold very satisfactorily, and with the exception of sales of about 2000 tons of No. 1 Steel Scrap, at the figures quoted, there has been little business of any consequence done. Prices of some grades show a little falling off, and bids and offers for deliveries in buyers' yards are quoted about as follows:

Old Steel Rails and Crops	\$16.50 to \$17.00
No. 1 Steel Scrap	16.25 to 16.75
Low Phosphorus	21.00 to 21.50
Old Steel Axles	20.00 to 20.50
Old Iron Axles	27.50 to 28.50
Old Iron Rails	20.50 to 21.00
Old Car Wheels	23.00 to 23.50
Choice No. 1 R. R. Wrought	18.00 to 18.50
Machinery Castings	18.00 to 18.50
Wrought Iron Pipe	14.50 to 15.00
No. 1 Forge Fire Scrap	13.75 to 14.25
No. 2 Light Iron	9.50 to 10.00
Wrought Turnings	13.50 to 14.00
Stove Plate	14.50 to 15.00
Cast Borings	12.25 to 12.75
Grate Bars	14.50 to 15.00
No. 2 Light Sheet Steel	13.00 to 14.00

Pittsburgh.

PARK BUILDING, October 2, 1907.—(By Telegraph.)

Pig Iron.—As yet there has been no buying movement in Pig Iron, actual sales consisting of small lots for prompt shipment and very few of these. The entire market, with the exception of Bessemer, is weak, with chances favoring still lower prices. A number of Eastern furnaces are offering Basic and Foundry Iron in this district at lower prices than named by the Valley furnaces, but so far these offers have not resulted in any material business. The market on Bessemer remains firm at \$22, Valley furnace. The furnaces making Bessemer have their product sold up, and consumers are taking the Iron as fast as the furnaces can ship it. Malleable Bessemer is offered at \$20 to \$20.50, Valley furnace, and Basic Iron about \$19.50 to \$20, but no sales of moment are being made. There is a wide range in prices quoted on Foundry Iron, some furnaces quoting as low as \$19.50 to \$20, Valley furnace, while one or two have sold small lots of Northern No. 2 Foundry for prompt shipment at \$21 to \$21.25 at furnace. We quote Northern No. 2 Foundry for forward delivery at \$19.50 to \$20, Valley furnace, while several furnaces that make very high grade Foundry are selling No. 2 at \$21 to \$21.25 at furnace and are getting business at those prices. There is nothing doing in Forge Iron, and the market is nominally \$19.50 to \$20, Valley furnace, or \$20.40 to \$20.90, Pittsburgh.

Steel.—The market on both Bessemer and Open Hearth Steel is weaker, as more Steel is being offered than for some time. We quote 4 x 4 in. Bessemer Billets at \$28.50 to \$29, and Open Hearth about \$30.50, Pittsburgh. Sheet and Tin Bars are firm, at \$31, maker's mill, Pittsburgh or Youngstown. Forging Billets, in sympathy with Rolling Billets, are somewhat weaker, and we quote these at \$32, Pittsburgh, but on large tonnage and for forward delivery this price might be shaded.

(By Mail.)

The situation presents no absolutely new features, the market being extremely quiet, and buyers showing much conservatism in making purchases. The political and financial conditions are not conducive to improvement in the Iron trade, but, on the contrary, the constant agitation along these lines is entirely responsible for the quietness now ruling and the uneasiness that exists as to the future. Buyers can see no inducement whatever to contract ahead, believing that by holding off they may be able to place their orders later on at lower prices. One fact is pointed out in connection with the present situation, and that is that premiums on nearly all lines, such as Pig Iron, Steel Billets, Plates, Bars and other materials, have disappeared, and these products are now being sold at prices that might indicate a heavy decline. When it is remembered that only a small tonnage was sold by the mills and furnaces for which premiums were paid, the actual decline in prices has been relatively small. A few lots of Bessemer Iron were sold three or four months ago as high as \$24 and \$25 at furnace, but this Iron was for prompt shipment, and buyers had to pay premiums to get it. Small lots of No. 2 Foundry were also sold as high as \$25 and \$26, prompt delivery, but the supply is now more plentiful and premiums have disappeared. Northern No. 2 Foundry Iron for last quarter delivery can now be bought as low as \$20, Valley furnace, and it is reported that \$19.50, Valley furnace, or \$20.40, Pittsburgh, has been done. Both Open Hearth and Bessemer Steel Billets are weaker, 4 x 4 in. Bessemer Billets now being offered for last quarter as low as \$28.50 and Open Hearth about \$30.50, Pittsburgh. There have been no important changes in prices on finished lines, but new tonnage in September, especially in the latter part of the month, showed some betterment. Consumers are specifying liberally against contracts in most cases, and shipments by the mills on nearly all lines are about as heavy as at any time this year.

Ferromanganese.—There is no large inquiry, and in sympathy with other lines, consumers of Ferromanganese are inclined to go very slow in the matter of purchases, buying only in small lots for early shipment. The price is now pretty well established on the basis of about \$55, Baltimore, or practically \$57, Pittsburgh, for delivery in last quarter. We note a sale of 200 tons of 80 per cent. foreign Ferro for delivery in last quarter at a slightly lower price, but there were some exceptional conditions attached to the sale. We quote 80 per cent. English Ferro at \$57, Pittsburgh, for delivery in last quarter.

Muck Bar.—The situation is quiet, there being but little inquiry, but prices are fairly strong. The mills rolling Muck Bar have a good deal of tonnage on their books, but some consumers are not specifying for deliveries as promptly as they did some time ago. We quote best grades made from all Pig Iron at about \$36, Pittsburgh, but on a firm offer this price would probably be shaded.

Skelp.—New business has quieted down and inquiries are light. However, the mills rolling Skelp have some large contracts on their books, against which buyers are specifying freely, and shipments are heavy. Prices are not actually lower, but are not as firm as they were some time ago, and there is some disposition on the part of the mills to go after new business. We quote: Grooved Steel Skelp, 1.85c. to 1.90c.; Sheared Steel Skelp, 1.95c. to 2c.; Grooved Iron Skelp, 2.15c. to 2.20c., and Sheared Iron Skelp, 2.25c. to 2.40c., depending on sizes and widths. All these prices are f.o.b. maker's mill.

Rods.—There is not much inquiry for Rods, but the market is firm, there being very few Rods offered in the market by the outside mills. The two leading makers of Rods have not been active sellers in the open market for some time. We quote Bessemer Rods at \$36 and Open Hearth about \$37, Pittsburgh.

Steel Rails.—The Steel Rail Committee, made up of the general committee of railroads and Rail mill engineers, is taking plenty of time to discuss the report of the subcommittee of eight, and as yet nothing has been made public as to what has been recommended in the matter of new Rail specifications. In the meantime, no business is being placed by the railroads, and none is expected until the recommendations have been adopted by both interests. Tonnage in Light Rails is only fair and competition in this line from mills re-rolling Rails is very active and may possibly bring about a readjustment of prices. Prices on Light Rails, which are being shaded by the mills re-rolling Rails, are as follows: \$33 to \$34 for 20 to 45 lb.; \$34 to \$35 for 16-lb., and \$35 to \$36 for 12-lb., at mill. Angle Splice Bars are held at 1.65c., and Standard Section Rails at \$28, at mill.

Plates.—New business continues somewhat light, and as shipments by the mills are heavy, they are catching up at a pretty fast rate on back deliveries. Premiums have practically disappeared. Prompt deliveries of Universal Plates can now be had without much trouble, but on Sheared Plates some of the leading mills are still from three to four months behind. There is some softness in prices, but so far no actual cutting is reported. We quote: Tank Plates, $\frac{1}{4}$ -in. thick, $6\frac{1}{4}$ in. up to 100 in. wide, 1.70c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than $\frac{1}{4}$ -in. to and including 3-16-in.	
Plates on thin edges.....	\$0.10
Gauges Nos. 7 and 8.....	15
Gauge No. 9.....	25
Plates over 100 to 110 in.....	05
Plates over 110 to 115 in.....	10
Plates over 115 to 120 in.....	15
Plates over 120 to 125 in.....	25
Plates over 125 to 130 in.....	50
Plates over 130 in.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	10
Complete Circles.....	20
Boiler and Flange Steel Plates.....	10
"A. B. M. A." and ordinary Firebox Steel Plates.....	20
Still Bottom Steel.....	30
Marine Steel.....	40

Shell Grade of Steel is abandoned.

TERMS.—Net cash 30 days. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Structural Material.—The contemplated Oliver office building, to be erected on Smithfield street, this city, and to take about 11,000 tons, has been put off until next year, high prices of labor and materials and tightness of the money market being assigned as the reasons. In September the American Bridge Company fabricated over 50,000 tons of material, one of the best months in its history. The McClinic-Marshall Construction Company has taken contracts for nearly 4000 tons of Eastern work, and the Cambria Steel Company has taken about 3000 tons for a large Western building. Financial conditions not being satisfactory, general work is slowing up a little. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15 in., 1.80c.; Angles, 3 x 2 x $\frac{1}{4}$ in. thick, up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x $3\frac{1}{2}$ in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c.; Bulb Angles and Deck Beams, 2c. Under the

Steel Bar card, Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—There is a fair amount of new business being placed, and specifications against contracts are coming in freely, customers still urging prompt shipments. The leading Sheet mills are still well filled up on Black, Blue Annealed and Galvanized Sheets, and on the latter are from 10 to 12 weeks back in shipments. Some mills can make fairly prompt deliveries on Black Sheets, on which premiums have practically disappeared. There has been some cutting in prices on Black and Roofing Sheets, but the general market is steady. Prices, which in exceptional cases have been shaded, as noted above, are as follows: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 2 gauge Painted Roofing Sheets at \$1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, \$3.25 per square, for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

Tin Plate.—The Tin Plate mills are moderately busy on contracts for shipment in October and November, but the amount of tonnage thus far placed by the canners has not been as heavy as last year, and is not yet large enough to give the mills full work in the last quarter of this year. The leading interest has several of its largest plants closed down, and these will be extensively repaired during the full demand for Tin Plate. The McKeesport Tin Plate Company, McKeesport, Pa., is figuring on building either 6 or 12 more hot mills to its plant. We quote \$3.90 for 700-lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 50c. a box is allowed for carload and larger lots.

Bars.—A feature of the situation is the heavy demand for Iron Bars, a leading interest advising us that it has taken on more tonnage in Iron Bars in the past two weeks than in the previous five or six. No large contracts are being placed, the heavy business being made up of small orders. Buyers are specifying quite freely against contracts, and the market on Iron Bars is fairly strong. No contracting ahead is being done in Steel Bars, business now being placed being mostly in small lots. However, the leading Steel Bar makers are filled up on contracts for four or five months, against which buyers are specifying freely. There is nothing whatever in the situation that would warrant a reduction in the price of Steel Bars, as it would not increase the consumption one pound, but, on the contrary, would seriously disturb existing contracts. The feeling of the large interests rolling Steel Bars is that the present market will be sustained for some time to come, and that attempts of large consumers to get a reduction in prices will be fruitless. We quote Steel Bars at 1.60c., base, Pittsburgh, and note that slight premiums are still being paid to mills that can make prompt shipments. Iron Bars are held at 1.70c., Pittsburgh, for delivery in the Pittsburgh District, and at 1.60c., Pittsburgh, for Western delivery.

Spelter.—Some large inquiries are in the market for Spelter, and prices are much firmer. We quote prime grades of Western Spelter at 5.15c., St. Louis, equal to 5.27 $\frac{1}{2}$ c., Pittsburgh, being an advance over the previous week of \$5 to \$6 a ton.

Merchant Steel.—We note a good demand for seasonable stock, such as Machinery Steel, and also note that demand for Tool Steels is quite active. The recent low prices ruling in Shafting have resulted in a good deal of tonnage being placed, and as the lowest sellers have withdrawn the market can be quoted on the basis of 55 and 5 per cent. off in large lots and about 55 per cent. off in carload lots, delivered in base territory. We quote: Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades, and 10c. and upward for special grades.

Railroad Spikes.—There is practically no buying of Spikes by the railroads, and some of the leading mills are actively hunting business. We quote Railroad Spikes in standard sizes at \$2 and smaller sizes at \$2.15 per 100 lb., Pittsburgh. It is likely these prices could be shaded on the standard sizes, if any large contracts were being offered.

Merchant Pipe.—The readjustment to a lower basis which has recently taken place in prices of Iron Pipe by some mills has given rise to reports that prices on Steel Pipe have also declined, but we can state that this is absolutely untrue. At no time this year have prices on Steel Pipe been firmer than they are at present, and indications are they will be maintained for the balance of this year at least.

A comfortable tonnage in Merchant sizes of Pipe is being placed, while in oil country goods the demand is very heavy, and shipments by the mills in September were as large as at any time this year. Financial conditions are not favorable for putting through ambitious Pipe line projects, and no large lines are in the market at present. Leading mills are still from three to four months behind on shipments on nearly all sizes, and if the present rate of new business is maintained it will be well into the new year before they have caught up on back orders. Discounts on Steel Pipe are as follows:

Merchant Pipe.

	Jobbers, carloads.	Steel.	Galv.
	Black.	%	%
1/8 to 1/4 in.	65	49	
1/4 in.	67	53	
1/2 in.	69	57	
3/4 to 6 in.	73	63	
7 to 12 in.	70	55	
Extra strong, plain ends.			
1/8 to 3/8 in.	58	46	
1/2 to 4 in.	65	53	
4/5 to 8 in.	61	49	
Double extra strong, plain ends:			
1/2 to 8 in.	54	43	

To the large trade all above discounts are subject to 1 point on the base, and 5 per cent. on the net.

Official discounts on Iron Pipe, which are shaded 2 points or more to the large trade, are as follows, f.o.b. Pittsburgh:

Standard Genuine Iron Pipe.

	Black.	Galv.
	%	%
3/8 to 6 in.	67	57
1/2 in.	62	50
1/2 in.	60	42
1/2 and 3/4 in.	58	42
7 to 12 in.	62	47

Extra Heavy Iron Pipe, Plain Ends.

3/8, 1/4 and 3/8 in.	62	40
1/2 to 4 in.	59	47
4/5 to 8 in.	55	42

Boiler Tubes.—New demand for Merchant Tubes has shown some betterment in the past week, but there is practically no buying of Railroad Tubes, or is any buying movement expected until the railroads commence to place orders for Rails. Discounts on Merchant Tubes are as follows:

Boiler Tubes.

	Iron.	Steel.
	1/2 in.	1/2 in.
1 to 1 1/2 in.	42	47
1 1/4 to 2 1/4 in.	42	59
2 1/2 in.	47	61
2 1/2 to 5 in.	52	65
6 to 13 in.	42	59
2 1/2 in. and smaller, over 18 ft. long, 10 per cent. net extra.		
2 1/2 in. and larger, over 22 ft. long, 10 per cent. net extra.		

Iron and Steel Scrap.—The Scrap market shows no important changes either as regards demand or prices. Consumers are adhering to the policy of buying only from hand to mouth and only for actual needs. We also note that consumers are not specifying very freely against contracts for Scrap placed some time ago, when prices were higher than they are now. We quote: Heavy Steel Scrap, \$17.50, for Pittsburgh, Steubenville or Sharon delivery; No. 1 Railroad Wrought Scrap, \$17.50 to \$17.75; Rerolling Rails, \$17.25 to \$17.50; No. 2 Wrought Iron Scrap, \$17; No. 1 Busheling Scrap, \$16 to \$16.50; No. 2, \$13; Bundled Sheet Scrap, \$14.50 to \$14.75; Low Phosphorus Melting Stock, \$21 to \$21.25; Old Steel Rails, short pieces, for Open Hearth use, \$17 to \$17.25; No. 1 Cast Scrap, \$19.50 to \$20; Cast Iron Borings, \$12.75 to \$13; Old Car Wheels, \$24; Steel Axles, \$21.50 to \$21.75; Stove Plate, \$14.75 to \$15; Grate Bars, \$15 to \$15.25. All above prices are per gross ton, f.o.b. buyer's mill, Pittsburgh, unless otherwise stated.

Coke.—Connellsville Furnace Coke for prompt shipment is scarce and is commanding from \$2.90 to \$3 a ton at oven. The demand for Foundry Coke is fairly active, and a contract for 72-hr. Connellsville Foundry Coke for delivery over the next year, commencing October 1, is reported to have been placed on the basis of \$3.30 a ton at oven. The Upper and Lower Connellsville regions made last week over 427,000 tons.

San Francisco.

SAN FRANCISCO, September 25, 1907.

Pig Iron.—Local market conditions are extremely quiet, although stocks are not large, and Scotch and English Pig Iron prices have an advancing tendency, owing to increased rates from Europe. It seems to be rather difficult to interest consumers along the line of future requirements and hand-to-mouth buying continues to a great extent. The continued dullness around the local foundries and engineering plants is not encouraging to importers of Pig Iron, but, as they are nearly all engaged in shipping grain or flour to Europe and the Orient, considerable quantities of iron continue to be shipped from foreign ports to San Francisco, as return cargoes, together with Coke and Fire Brick. From European ports about a dozen vessels are now afloat with Pig Iron for this city and half as many are afloat from other ports. A feature of the situation that is attracting some attention just now is the effort that is being made to in-

duce Chinese Pig Iron here, and some very low quotations have been made by the local agents for the Celestial article. Several of the large engineering plants of this city have been giving it a trial, but there is not a great demand for that grade of Iron. The cost of production in China is low, and the tramp steamers which are continually coming from Oriental ports to the Pacific Coast to seek cargoes of lumber and flour furnish prompt transportation. Prices are about as follows, delivered in this city:

No. 1 English Foundry	.....	\$29.00 to \$30.50
No. 1 Scotch Foundry	.....	30.00 to 32.50

Structural Steel.—Deliveries are being made promptly by the Eastern mills on the balance of the requirements for buildings that have been started. The erection of the Steel for several large Steel cage structures has just been completed. At least 25 Steel frame buildings, ranging from 4 to 14 stories, are still in course of construction, and it is expected that the proportion of these structures erected next year will be greater than this season. A prominent engineer says one reason why more Structural Steel has not been used in the rapid rebuilding of San Francisco is that, soon after the fire, representatives of some of the large engineering and construction companies of the East came to the city strongly advocating reinforced concrete construction. Deliveries of Structural Steel in large quantities were rather uncertain, but large shipments of foreign cement could be obtained within a reasonable time. Most of the 80 reinforced concrete structures that have been erected since the fire were taken on the percentage plan, and in many cases the original estimate of cost was exceeded by from 25 to 40 per cent. According to this informant the cost of most of the reinforced or ferroconcrete structures exceeded that of Steel frame buildings, in some instances as much as 25 per cent. The result is a gradual reaction in favor of skeleton Steel frame construction, which has already resulted in some inquiries for Structural Steel, and next year will undoubtedly see a considerable increase in the demand for this material. There is at present comparatively little demand for Steel for reinforced concrete construction, the rush being over. Heavy importations of foreign cement continue.

Steel Rails.—The demand for standard gauge and heavy Girder Rails for electric railroad lines is still very light. There is some inquiry, however, for light mining Rails, but the mining demand has been rather unreliable of late, owing to unsettled conditions over the labor questions in many of the mining districts. Still there is, on the whole, a steady growth of mining business for the entire Pacific Coast. While the work will be delayed on a number of the projected small railroads on the coast, for lack of sufficient funds, a number of new electric roads have been planned recently with some prospects of early construction work. Rails have arrived for the completion of the Southern Pacific Bay Shore cut-off on the peninsula south of San Francisco, on which there are five large double track tunnels. The opening of the new freight yards at Visitacion Bay, 6 miles south of the city, will greatly facilitate the deliveries of Iron and Steel from the Eastern mills. The Southern Pacific Company is preparing to lay several miles of new tracks along the north water front of San Francisco, extending westerly from the foot of Powell street several miles to the Presidio. It will amount to an extension of the Belt Line Railroad, which already covers part of the water front.

Tin Plate.—The season just closed has been an excellent one, especially on account of the demand for fruit cans, notwithstanding the shortage in some varieties of fruits. The salmon season was also very prosperous, and with only a small carry over good prices for the year are assured in the two important industries that consume very large quantities of Tin Plate each year. Although the packs this season were not the largest on record, prices of Tin Plate were better than last year and are still firm at the opening prices announced in January, 1907. Freight is coming through in very good time. Deliveries from the mills have improved slightly during the past month. Sales are made on a basis of 14 x 20 at \$4.60 per 100 lb.

Sheets.—The Sheet trade is keeping up quite as well as any of the collateral branches, but jobbers are restricting their purchases until after the municipal election, which means much to the manufacturing and building interests. Stocks of Galvanized Sheets in jobbers' hands have run down until they begin to look ill assorted.

Cast Iron Pipe.—The outlook for business is favorable and deliveries by rail are prompt, but dealers complain that the freight rates from the East are too high. About 30,000 tons per annum are shipped to the coast from the Eastern Pipe foundries. The only plant that casts Pipe on the Pacific Coast is that of the Oregon Iron & Steel Company, near Portland, which has a capacity of 6000 tons a year. Chief Engineer Mulholland of the Owens River municipal water project for the supply of Los Angeles, Cal., by a conduit 240 miles in length, is engaged on the preliminary work for a 5-mile tunnel at Elizabeth Lake. The State Board of Examiners has voted to subscribe one-half of the first issue of \$1,020,000 water bonds with the understanding

that the other half be taken by the Los Angeles banks. The total cost of the completed system is estimated at \$23,000,000. A municipal cement factory is to be installed in connection with the project.

Old Materials.—The market exhibits a slightly stronger tone. The Iron and Steel Scrap from the ruins of the burned district is largely out of first hands. The owners of Iron yards have the stocks pretty well corralled and will make the most of the situation. Cast Scrap has advanced a little, keeping pace with Pig Iron. The consumption of Wrought Scrap and Steel Scrap is keeping up well at the local plants and will increase as additional rolling mills are installed. Steel Scrap sells at \$5 to \$10 per ton, according to the shape it is in. The higher price is for Scrap cut into short lengths. The quotations given below on Cast Scrap are for the Iron broken and delivered to the foundry. Dealers' prices are about as follows:

Wrought Scrap.....	\$10.00 to \$11.00
No. 1 Cast Scrap.....	16.00 to 17.00
No. 2 Cast Scrap.....	14.00 to 15.00

Cleveland.

CLEVELAND, OHIO, October 1, 1907.

Iron Ore.—Ore has been moving down the lakes in satisfactory shape the past week. It is expected that the September shipment of Ore will show up well, although the movement will be below that of August. While considerable Ore is now being piled on the docks at Lake Erie ports, it is believed that a larger percentage will be taken direct to the furnaces this year than ever before. Considerable interest in next year's prices is being aroused among furnace men. Although shippers express the opinion that prices will be about the same as this year, they are disposed to wait to see the general condition of the Iron and Steel industry before establishing a price. Last year nearly all the Ore was bought in the latter part of November and the first week or two in December, but it is believed that the buying movement will not begin so early this year. There is very little demand for this season's Ore, the reported shortage, particularly in Bessemer Ore, not having caused a noticeable increase in the number of inquiries. Ore prices are as follows, at Lake Erie docks, per gross ton: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range Non-Bessemer, \$4.25; Mesaba Non-Bessemer, \$4; Siliceous Bessemer, \$2.75; Siliceous Non-Bessemer, \$2.35 to \$2.60.

Pig Iron.—The demand for spot Foundry Iron has fallen off considerably. A few sales are reported, but the aggregate tonnage disposed of was small. Prices are unchanged, but there is a tendency toward further weakness. While local furnaces are not accumulating any Iron, reports indicate that Valley furnaces have more Foundry Iron than they can dispose of for quick shipment. Some Valley furnaces have changed from Foundry to Bessemer Iron during the past few days. Local furnaces quote No. 2 Foundry Iron at \$21.50 to \$22, at furnace, but offerings as low as \$20, at furnace, are reported in the Valleys. One interest is not asking over \$20.50, at furnace, for spot Iron, and considerably lower prices have been quoted by Virginia furnaces that are looking for a market in Ohio. There are still some requests that shipments be withheld, but, on the other hand, there is an occasional request for prompt shipment on contract. Foundries are beginning to show some concern about next year's prices. They are receiving inquiries for prices for castings for next year, but consumers will not close contracts based on the present price of Pig Iron. An occasional inquiry is being made to test the market, but no offer of No. 2 for first half delivery is reported below \$21. In a few cases foundries have closed contracts for castings, the price to be based on the selling price of Pig Iron for next year. Bessemer Iron is strong and scarce. It is held at \$22, Valley furnace, and perhaps \$22.50 could be got. There is an inquiry in the local market for 3000 tons of Basic Iron for last quarter delivery. A price of \$20.50, Valley furnace, was quoted. Quotations for the balance of 1907, f.o.b. Cleveland, are as follows:

Bessemer.....	\$22.90
Northern Foundry, No. 1.....	\$22.00 to 22.50
Northern Foundry, No. 2.....	21.50 to 22.00
Northern Foundry, No. 3.....	21.00 to 21.50
Gray Forge.....	20.90

Coke.—The market is quiet, but firm. Consumers are pretty well covered for the balance of the year and there are only a few inquiries, but there is a good demand for both grades of Coke on contract. We quote Connellsburg Furnace Coke at \$3, at oven, and 72-hr. Foundry Coke at \$3.25 to \$3.50, at oven.

Finished Iron and Steel.—There has been somewhat of an improvement in both new business and specifications. An order was placed by the American Shipbuilding Company with the Jones & Laughlin Steel Company for 3000 tons of Plates and Structural Material for a lake boat for 1908 delivery, and it is understood that there are other boat contracts in sight that will require several thousand tons of material. Other orders of importance included 2000 tons of Structural Material for a local warehouse, 600 tons of

Structural Material for a local fabricating plant and 500 tons of Iron Bars. Some improvement is noted in the Plate specifications, and there is a good demand for Tank Plates. Mills are catching up considerably on deliveries on Sheared Plates, and the majority of the mills are now in shape to make fairly prompt deliveries on Universal Plates. Owing to the easing up of the Plate situation, one mill that has been doing only a premium business is now taking Plate orders at the market price. A slight improvement is noted in the demand for Bar Iron. Local mills are getting enough orders to keep them busy. There is some complaint among consumers that mills are anticipating deliveries on Bar Iron specifications. We quote Iron Bars at 1.65c., Cleveland. Mills outside of the city are asking 1.60c., Pittsburgh. We quote Steel Bars at 1.70c., Cleveland, for car lots, with half extras. The Sheet situation is easy, but as yet there is little evidence of price cutting. A few sales of Forging Billets in car lots are reported at \$34 to \$35, Cleveland. A western Pennsylvania mill has notified its customers that it can make good deliveries on Forging Billets, quoting a price of \$34, Johnstown, and has received a number of inquiries. A little improvement is noted in the demand for Structural Material. There is also a better demand for Light Rails. The price is firm at \$33, Pittsburgh, for 25 to 45 lb. There is no demand for Railroad Supplies. Spikes are weaker, being quoted at 2c. to 2.10c., Pittsburgh, for standard sizes. We quote Beams and Channels at 1.80c., base, Cleveland, for carload lots, and Plates, 1/4-in. and heavier, carload lots, 1.80c. Warehouse business continues good in all lines and prices are unchanged. We quote Steel Bars out of stock at 1.90c. to 1.95c., and Iron Bars at 1.95c. to 2c. Jobbers' prices on Sheets are as follows: Blue Annealed, No. 10, 2.30c.; No. 28 One Pass Cold Rolled, 3.05c.; No. 28 Galvanized, 4.05c. Beams and Channels are 2.10c. to 2.15c., base, out of stock. The warehouse price on Boiler Tubes, 2 3/4 to 5 in., is 64 per cent discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent discount.

Old Material.—There is a slight improvement in the demand for Scrap for immediate needs, but the mills are buying only in very small lots. Most mills seem to have enough Scrap on hand to last them for a while, although their contracts have nearly all run out. Prices are inclined to further weakness and dealers to make sales have to go from 15c. to 25c. a ton below ruling quotations. Dealers say that most grades of Scrap are not plentiful and they complain that they have difficulty in picking up lots at present prices. Busheling, for which there have been several inquiries in the market during the week, is still quite scarce. The Lake Shore Railroad sold about 1500 tons of Old Material last week and the Erie and Pennsylvania roads have lists out this week, the latter offering about 1000 tons. There is little change in quotations, which are for the most part nominal. Dealers' prices to the trade per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails.....	\$16.50 to \$16.75
Old Iron Rails.....	22.00 to 22.50
Steel Car Axles.....	21.50 to 22.00
Old Car Wheels.....	22.50 to 23.50
Relaying Rails, 50 lb. and over.....	27.50 to 28.00
Relaying Rails, under 50 lb.	30.00 to 31.00
Heavy Melting Steel.....	16.00 to 16.50
Railroad Malleable.....	17.75 to 18.25
Agricultural Malleable.....	15.50
Light Bundled Sheet Scrap.....	13.50 to 14.00

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles.....	\$25.00 to \$26.00
Cast Borings.....	10.00 to 10.50
Iron and Steel Turnings and Drillings.....	10.50 to 11.00
Steel Axle Turnings.....	13.00 to 14.00
No. 1 Busheling.....	14.00 to 15.00
No. 1 Railroad Wrought.....	16.00 to 16.50
No. 1 Cast.....	17.00 to 17.50
Stove Plate.....	14.00 to 14.50
Bundled Tin Scrap.....	10.00

The Cuyahoga Falls Power Company is being organized by C. M. Walsh and other business men of Cuyahoga Falls, Ohio, for the purpose of erecting a 40-ft. dam across the river in the center of that village and a power house to supply power for factories along the banks of the river. It is estimated that 2000 hp. can be developed. A project under consideration with the proposed power plant is the formation of a company for the manufacture of iron products.

The International Engineering Company has been organized at Ft. Wayne, Ind., and incorporated with \$200,000 capital to take over the Haberkorn engine patents. The Haberkorn Engine Company has been building the engines for several years. The incorporators of the new company are George H. Loesch, Fred D. Hoham, John B. Reuss, Chas. H. Doebler, Fremont L. Jones, Wm. D. Henderson, Chas. B. Fitch, Wm. J. Vesey, John A. Shoaff and Aaron Rothchild.

October 3, 1907

Cincinnati.

FIFTH AND MAIN Srs., October 2, 1907.—(By Telegraph.)

If any change is presented in the attitude of melters toward the future it certainly does not partake of a buying inclination. Prominent brokers report the past week as the dullest in the year's flight. Some have gone into statistics, and finding that the production of Pig Iron in the South has not increased in the past four or five years, and the pace, productively speaking, has been of the laggard order, contemplate the law which regulates supply and demand and console themselves with the prospects of a big buying movement, bound to come sooner or later, with its attendant compensations in the way of prices. There is no sale for 1908, and both melter and producer are busy on the last quarter's requirements, the melter demanding immediate delivery on contracts placed early in the year, and the furnace men making barely enough Iron to fill these contracts; in the case of the high grades, at least, only enough to go around. It is generally conceded that the car shortage is bound to cut quite a figure with the price and deliveries of Iron next year. There have been some inquiries for first quarter Iron, but nothing has resulted in the way of sales, and, seemingly, neither the inquirer nor the broker takes each other seriously, nor so far has established a figure that might serve as a basis for computation. One of the features of the Iron horoscope as cast for this section is the improvement in collections, which suggests an entirely satisfactory buying movement when it does commence, and a precursor of more satisfactory conditions at the furnaces generally. It is believed that \$17.50 may be done on first quarter Iron, but no sales are reported at that figure.

Pig Iron.—Sales for the most part are confined to small lots. One inquiry for a 2000-ton lot of Basic, destined for St. Louis, was a feature of the week, but so far as can be learned no business resulted at the offer of \$20.75, Valley furnace. A good demand is reported for High Silicon Irons. An Indianapolis concern is in the market for Foundry grade. A 5000-ton lot of Southern Foundry No. 2 sold to a Detroit melter at \$18.50, Birmingham, was an incident of the week. Another sale was a 5000-ton lot of No. 2 Northern, at \$21.50, furnace. Sales agents are standing firm, on the basis of \$18.50, Birmingham, for No. 2 Foundry for immediate shipment and no confirmation can be obtained of reported sales of \$18 Iron. It is generally conceded that practically all resale Iron has disappeared, at least so far as the brokers are concerned, for a party offering a small lot at that price, when pressed by the broker to close, failed to respond. There is a little inquiry for Gray Forge, which is easily supplied at about \$15.75, Birmingham. There is no delay in shipment of the low grades from the furnaces, for all seem to have surplus stocks, but on the higher grades it is an entirely different matter. The disposition of furnaces to get all Iron booked for the last quarter in transit at the earliest possible moment is showing up the car shortage situation more forcibly every day, and some consumers who waited until the last moment to cover find themselves confronted with an awkward predicament. In short, the hand-to-mouth policy finds its best illustration in the present attitude of the melter toward his sources of supply. In the following quotations prices are based on Cincinnati delivery, the Birmingham rate being \$3.25 and that from the Hanging Rock District \$1.20.

Southern Coke, No. 1	\$21.75 to \$22.25
Southern Coke, No. 2	21.25 to 21.75
Southern Coke, No. 3	20.75 to 21.25
Southern Coke, No. 4	19.25 to 19.75
Southern Coke, No. 1 Soft	21.75 to 22.25
Southern Coke, No. 2 Soft	21.25 to 21.75
Southern Coke, Gray Forge	18.75 to 19.25
Southern Coke, Mottled	18.25 to 18.75
Ohio Silvery, 8 per cent. Silicon	30.20 to 30.70
Lake Superior Coke, No. 1	22.70 to 23.20
Lake Superior Coke, No. 2	22.20 to 22.70
Lake Superior Coke, No. 3	21.70 to 22.20

Car Wheel Irons.

Standard Southern Car Wheels	\$29.25 to \$29.75
Lake Superior Car Wheels	27.70 to 28.00

Coke.—The Coke market is firm and the ovens are taxed to capacity in favorite fields to supply the demand, which is found extremely difficult to meet owing to the increasing shortage in cars. All kinds of expedients are being resorted to in the general quest for shipping facilities. The most serious complaint comes from the fields tapped by the Norfolk & Western and the Louisville & Nashville. This trouble, coupled with vexing labor conditions, makes the lot of the Coke producers an unenviable one at the time. Connellsville Furnace is quoted at \$2.75 to \$3 at ovens; Foundry at \$3.25 to \$3.50; Wise County Furnace, \$2.65 to \$2.75 at ovens; Foundry, \$3.25 to \$3.50.

Finished Iron and Steel.—Local dealers report an improved market all round, especially well defined on Structural Shapes and Sheets. One dealer had better sales for the past week than for a month previous, with no cancellations. Mills are reported 90 days behind on Bars and Sheets. On Structural Material the situation is better and practically immediate deliveries are made. Dealers quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.80c., with half extras; small lots from store, 1.95c., base, full ex-

tras; Steel Bars, carload lots, 1.75c., base, half extras; small lots from store, 1.85c., base, full extras; Base Angles, carload lots, 1.85c.; small lots from store, 2.10c.; Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.25c.; Plates, $\frac{1}{4}$ -in. and heavier, carload lots, 1.85c.; small lots from store, 2.10c.; Sheets, No. 16, carload lots, 2.20c.; small lots from store, 2.55c.; No. 14, carload lots, 2.10c.; carload lots, 1.95c., base; Plates, 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.25c.; Sheets, No. 10, 2c., carload lots; 2.30c. from store; Sheets, No. 12, 2.05c., carload lots; 2.40c. from store; Light Sheets, Black, No. 28, carload lots, 2.75c.; Galvanized, No. 28, 3.90c.

Old Material.—There is no movement in the Scrap market. The larger dealers are for the most part making necessary improvements in their plants and preparing for the expected heavier demand when the crop movement and other seasonable occupations subside. Dealers quote, f.o.b. Cincinnati, about as follows:

No. 1 R. R. Wrought, net ton	\$14.50 to \$15.00
Cast Borings, net ton	8.50 to 9.00
Steel Turnings, net ton	9.50 to 10.00
No. 1 Cast Scrap, net ton	17.50 to 18.00
Burnt Cast and Wrought, net ton	9.50 to 10.00
Old Iron Axles, net ton	22.50 to 23.00
Old Iron Rails, gross ton	19.50 to 20.00
Old Steel Rails, long, gross ton	16.00 to 16.50
Relaying Rails, 56 lb. and up, gross ton	27.50 to 28.00
Old Car Wheels, gross ton	22.50 to 23.00
Mining Car Wheels, gross ton	12.00 to 13.00
Low Phosphorus Scrap, gross ton	19.00 to 19.50

New York.

NEW YORK, October 2, 1907.

Pig Iron.—Only a moderate amount of business has been done. What pressure there is now is chiefly in misfit and off grade Irons. There is some uncertainty in Basic Pig. Deliveries of Foundry Iron are being well taken. We quote Northern Irons, tidewater, \$21.25 to \$21.75 for No. 1 Foundry, \$19.75 to \$20.25 for No. 2 Foundry and \$19.25 to \$19.50 for No. 2 Plain. Alabama Iron is nominally \$21.75 to \$22.25 for No. 2 Foundry.

Steel Rails.—The amount of Rail business placed in the week is insignificant. More is heard of business that has really amounted to reservations of rolling space for 1908, the stipulation being that the tonnage named will be formally contracted for when there is agreement between the railroads and the Steel companies as to the specifications that have been under discussion for some weeks. The American Railway Association's committee on the Rail question has been in separate session the past week and has also had joint sessions with the committee of engineers representing the Rail manufacturers. The tentative specification that has been under consideration by the sub-committee of eight will be presented finally to the semi-annual convention of the American Railway Association, which meets in New York, October 30. Of the Manchurian Rail order 12,000 tons has been placed in the United States and 15,000 tons is still pending, the German offer not being accepted as yet, because of objections by the Japanese engineers to basic Bessemer Steel. The recently reported inquiry from Turkey does not interest Rail manufacturers in this country in view of features of Turkish procedure in connection with previous contracts. A portion of the Santa Fé contract, let some time ago, but not reported at the time, was 6000 tons, taken by the Illinois Steel Company.

Structural Material.—While the low prices named in some bids on Structural work that have gone in in the past few weeks would indicate a lessening of the volume of such work, the records of the large interests which follow these lettings closely tell a different story. Surprise has been expressed in view of the well-known condition of the money market that construction keeps up as it does. The number of contracts let involving small or moderate tonnage is large, and the approach of the closed season has not had the effect that might be expected. The American Bridge Company booked 33,000 tons of new business in September, which compares with 53,000 tons in August. The expected tonnage for October is even somewhat less than the total for last month. On the face of it this points to recession; but the fact appears to be that independent interests have taken more work than usual recently. Estimates by competent authority, based on a close tabulation of work awarded last month, indicate that the leading interest took only about 25 per cent. of the total. This would mean that from 120,000 to 125,000 tons of Structural Steel work was given out in September. A large amount of construction is being figured on in the West, particularly in the Mississippi Valley. From preliminary inquiries it is estimated that 30,000 tons of railroad bridges and elevated structures will come up in that district in the next four months, and that a similar tonnage for buildings will be placed before December 1. Among recent lettings are 2000 tons of elevated crossings at Chicago for the Chicago & Northwestern Road, taken by the Mc-Clintic-Marshall Construction Company; 3500 tons of crossing work for the Big Four at Cincinnati, the general contract for which was taken by Louisville interests; 1800 tons of

crossing work for the Cleveland & Pittsburgh Road at Cleveland, Ohio, taken by John P. Cowing; 1000 tons for an electric railroad at Towanda, Pa., taken by the Owego Bridge Company; 1100 tons for an Indiana plant of the Pittsburgh Plate Glass Company, taken by the Indiana Bridge Company; 500 tons for an elevated railroad incline at Chicago; 500 tons for a public institution in Chester County, Pennsylvania, taken by the Phenix Bridge Company. In New York City the requirements for new public school buildings, on which construction will begin as soon as plans can be completed, are considerably more than was counted on in the summer. It is estimated that 30,000 tons of such work is yet to be placed to meet the need for more room. The Structural mills are particularly crowded to get out the larger sizes. We quote on mill shipments the following tidewater delivery prices: Beams, Channels, Angles and Zees, 1.86c.; Tees, 1.91c. On Beams, 18 to 24 in., and Angles over 6 in., the extra is 0.10c. Sales out of stock, of material cut to length, are made at 2 1/4c. to 2 1/2c.

Bars.—While manufacturers of Bar Iron would be pleased to see a more active market, the current demand is by no means dull, and occasionally a good round lot is purchased. The car shops are among the best buyers at present. The current price is still 1.60c., Pittsburgh, or 1.76c., tidewater, this being occasionally shaded by some of the smaller mills making a limited range of sizes. Steel Bars are quoted at 1.60c., Pittsburgh, or 1.76c., tidewater, with a continued fair demand, and a slight premium necessary to secure prompt shipment.

Old Material.—The demand is becoming more general and in some cases the inquiries are for round lots. While no marked strength is shown, except on some classes of Foundry stock, it would seem that present prices are either at bottom, or close to it, and if the manufacturing end of the trade should keep active Scrap is regarded as more likely to advance than to decline. A considerable tonnage of Steel Melting Scrap has been sold in the past 30 days for delivery over the balance of the year. The Steel works are nearly all running full force, with orders which will keep them busy at least until the new year. An agreeable feature of the present situation is that with the current prices of Scrap manufacturers of finished products are in a better position to make some profit than they have been for many months. Puddling material particularly has long been held at figures that left absolutely no profit to the rolling mills. Quotations per gross ton, New York City, are as follows:

Old Girder and T-Rails for melting	\$13.00 to \$13.50
Heavy Melting Steel Scrap	13.00 to 13.50
Old Steel Rails, rerolling lengths	16.00 to 16.50
Relaying Rails	26.00 to 26.50
Old Iron Rails	20.00 to 20.50
Standard Hammered Iron Car Axles	24.00 to 25.00
Old Steel Car Axles	19.00 to 19.50
No. 1 Railroad Wrought	16.00 to 16.50
Iron Track Scrap	14.50 to 15.00
No. 1 Yard Wrought, long	14.50 to 15.00
No. 1 Yard Wrought, short	14.00 to 14.50
Light Iron	9.00 to 9.50
Cast Borings	10.50 to 11.00
Wrought Turnings	11.50 to 12.00
Wrought Pipe	11.50 to 12.00
Old Car Wheels	22.00 to 22.50
No. 1 Heavy Cast, broken up	16.50 to 17.00
Stove Plate	14.00 to 14.50
Grate Bars	12.50 to 13.00
Malleable Cast	15.50 to 16.00

Metal Market.

NEW YORK, October 2, 1907.

Pig Tin.—The statistical position of this metal, given in the figures compiled by C. Mayer, secretary of the New York Metal Exchange, shows the reason why prices have been slowly declining. The total visible supply on September 30 was 12,498 tons, an increase of over 600 tons as compared with the end of August and an increase of nearly 300 tons as compared with September 30, 1906. This is notwithstanding the fact that shipments from the Straits in September were more than 1000 tons less than for the same month last year. Stocks in the United States, exclusive of Pacific ports, are figured as 1248 tons, a decrease of 300 tons as compared with the end of August, but the Minnehaha brought on October 1 from London 515 tons, which should be added to the stocks. There are afloat for American ports 1450 tons. In addition to the larger stocks here in warehouses and afloat it is believed that the stock in the hands of consumers is somewhat in excess of the supply here last year. Price changes during the week have been toward lower levels, 5-ton lots in New York having been sold at the following quotations:

	Cents.
September 25	37.10 to 37.25
September 26	36.50
September 27	35.60 to 35.65
September 28	35.65
September 30	35.45 to 35.50
October 1	35.55 to 35.60
October 2	34.70

Consumers are only buying for nearby use and are not disposed to speculate. The severe decline of £5 on the London exchange to-day brought prices down to the lowest figure of the year, at £156 10s. for spot and £154 10s. for futures.

Copper.—A better feeling exists in the trade, even though sales have been made at lower prices, but buying, even of this hand to mouth character, has made considerable inroads on the accumulations carried by smaller interests, so they have more confidence and are willing to await future developments. The so-called independent sellers of Electrolytic will shortly be out of November Copper, and those who must have Copper for that month will have to turn to the larger selling interests. The lake producers likewise have been selling some, reducing their surplus of metal and increasing their bank account, and hence they likewise have more confidence, and moreover there is a general feeling that although prices may go even lower than at present, the market will ultimately settle itself at around 15c. The United Metals Selling Company has again reduced its price to European consumers, naming 14.75c. f.o.b. New York, and intimating that bids would be given consideration. Aron Hirsch & Sohn have offered metal at lower figures, and a London house has effected sales at 14.50c. f.c.b. New York. The export situation shows clearly that buyers in Europe are much more disposed to take Copper from this country, the total exports for September being 17,157 tons, only slightly less than the exports for September, 1906. Considerable of this was on consignment, however. In this connection there has been an order given for some 1800 tons to be exported to China, distributed over six months, but this will cut but little figure in the monthly totals. China had previously been buying in Japan and Australia as well as London, so it is simply a transfer of her account. Domestic consumers are maintaining great secrecy about the price of the small lots they are buying. It is evident, though, that lake can be had at 15c. to 15.25c., most of the sales having been made at 15.12 1/2c. The few who have secured Electrolytic below 15c. have been fortunate, but there is plenty to be had at that figure. Casting grades can be had at 14.25c. to 14.50c. Confirmation is at hand that the melt of Copper in many of the larger establishments has fallen to one-half and even one-third of the former quantities. Of course the Wire drawers have had the most severe decline in trade. The London market is again on the verge of demoralization, closing to-day at £61 15s. for both spot and futures. The Brass Association has again revised prices, the inside quotation for Sheets being 15c.; Brass Tubing, 20c., base, while Copper Tubing is 23c., base.

Waterbury Average.—The Waterbury average for September was 16.50c.

Pig Lead.—Actual business in Lead is very quiet, and there are few inquiries. The price is easier and prompt shipments can be had at 4.8c., New York, or 4.52 1/2c., St. Louis. The American Smelting & Refining Company continues to quote 4.75c. governing old contracts. The price in Europe is firm at £19 15s., but exports from this country are larger, amounting to about 6000 tons during September.

Spelter.—There has been considerable buying of Spelter by galvanizing works, and several large orders were closed during the week at prices below those ruling to-day, which are 5.20c. to 5.25c. f.o.b. St. Louis, and 5.40c. f.o.b. New York. Spelter producers in the West are taking steps to put the market on a better basis.

Antimony.—The price is higher, and some of the large importers have made bids for goodly quantities. Cookson's can be imported at 12c., and is held at 12.50c. for small lots; Hallett's, 11c. to 11.50c., and outside brands 10.50c. to 11c.

Ferroalloys.—Ferrisilicon is growing scarcer daily. The largest importer is out of the market, a large Philadelphia seller is behind in the matter of deliveries, while an American manufacturer is so far behind as to be practically out. Spot is a matter of special price, but futures can be had at \$100. Ferromanganese is quoted at \$52, Baltimore, for shipment, and offerings of spot at equivalent to \$55, Baltimore, failed to bring business.

Tin Plate.—The continued decline in Pig Tin gives the impression that the price of Tin Plates may be reduced, particularly as Tin is now 5c. per lb. below what it was when the present \$3.90 basis for Tin Plate was established, but it is pointed out that Tin Plate Bars are \$1.50 per ton higher than a year ago, and unless Pig Tin declines further or Tin Plate Bars are reduced no change can be expected. Prices to-day are unchanged at \$3.90, f.o.b. Pittsburgh, and \$4.09, f.o.b. New York.

Old Metals.—Conditions have improved slightly, but the path of the Old Metal dealer is not very attractive as yet. The severe declines of a month ago have disappeared, however, and now dealers' selling prices are steadier, the only changes from last week being a reduction in the outside price:

	Cents.
Copper, Heavy and Crucible	14.00 to 14.25
Copper, Heavy and Wire	13.50 to 13.75
Copper, Light and Bottoms	12.50 to 12.75
Copper, Machine Composition	13.00 to 13.25
Brass, Heavy	10.00 to 10.25
Brass, Light	8.00 to 8.25
Clean Brass Turnings	8.50 to 9.00
Composition Turnings	10.75 to 11.25
Lead, Heavy	4.50
Lead, Tea	4.25
Zinc Scrap	4.00

The Machinery Trade.

NEW YORK, October 2, 1907.

Orders received in the trade the past week for machine tools were neither large nor very numerous, the actual business transacted indicating another lull, which is unusual for this time of the year—the time when the fall trade generally looks up. Contrary to former years, with the exception of 1905 and 1906, a fairly good business was done during July and August, the regular summer depression occurring this year in September, which month is stated to have been the dullest of the year. This condition, however, is thought to be temporary and will undoubtedly right itself in a short time. Those in the trade seem to be optimistic as to the near future, and some ground for a return of a more active demand is furnished by the good sized inquiries that have come into the market within the past few days from important interests. The smaller railroads are also coming into the market more freely. It is with the inquiries that manufacturers are especially concerned at the present time, because it is from them that they secure future business, and bookings for the first part of the year are what they are most anxious to secure as their plants are practically filled for the next three months. Manufacturers are making more persistent efforts to secure new business, and as this is an indication of a return of better deliveries dealers will soon be in a better position than they have been for some time to supply the demand. Reports from the West indicate a much better demand for machinery than that in this territory, due, it is said, to the more abundant supply of money in that section. Within a short time it is expected that the money will come East, which, with the influence of the Western prosperity, will tend to better the demand here.

There seems to be an increase in the heavy power line, according to a number of men who sell that class of equipment, but it is noticed that the majority of those who are asking for bids on power machinery do not seem to be in any great hurry to get their material and will be suited with extended terms as to deliveries. This is largely due to the fact that the machinery is intended to replace power apparatus now in use which has become obsolete. Heretofore manufacturers have been so busy that they have had no time to put in new equipment and have been making the old machines do. In this connection it may be added that there is a big demand for repairs on all classes of equipment, which is attributed to the fact that most of the machinery that has been in use for the last few years has been operated at a record breaking rate.

Machinery houses in Canada are said to be enjoying an especially good business, the demand being so much greater than the supply that a considerable surplus of orders is being received in this country, manufacturers preferring to pay the duty for American machines than to wait. A prominent manufacturer states that the demand for his machines has been very good of late and that he has just received an order for one of his largest machines, the price being several thousand dollars. In this connection it is of interest to note that manufacturers of finished iron and steel products in the Dominion are expanding considerably. A list of machinery requirements is now being made up by a Toronto steel and wire company, on which American manufacturers will undoubtedly be asked to figure within a short time.

The Japanese purchasing houses are rather busy and some orders have been placed in this vicinity for machine tools for delivery at Yokahoma, Japan. There are also some inquiries out for this class of equipment and this is taken as an encouraging sign by the trade, as the buying from that source has recently fallen off to some extent.

Spanish-American Iron Company's Inquiries.

The Spanish-American Iron Company, 171 Broadway, New York, has specifications out for the power equipment of its enterprise at Mayari Incline, Cuba, where it is spending about \$5,000,000 in the development of valuable iron ore properties. The power equipment in question is intended for an incline railway and about 4000 hp. is specified. The company has been buying considerable in the way of machine tools, one Liberty street house getting an order amounting to about \$7000. The enterprise will also call for the purchase of ore handling and conveying equipment, and perhaps some additional mining machinery, although the actual work of mining the ore has commenced. J. E. Little, Steelton, Pa., who can be addressed in care of the vice-president of the Pennsylvania Steel Company, is the mechanical engineer for the enterprise, and Charles F. Rand, who is at 171 Broadway, has the general supervision of the project.

Mining machinery men in this country have been getting a number of inquiries and some trade from Mexico of late, where mining operations are rather active. The demand for this class of equipment for that country has fallen off to

some extent, but not enough to affect the trade, as most of those making mining equipment have been rather more busy than they would wish to be, and they have in some cases been obliged to disappoint good customers on the question of delivery. The Mexicans seem to favor this market for mining machinery, because they can visit New York and interview the sellers direct. It may be added that the machine tool trade in Mexico has been picking up of late, and New York houses that recently established connections there are doing as well if not better than they had hoped for. A noticeable difference between the Mexican trade and that of the South American countries and Cuba is that the buyers are willing to pay in a shorter time than the purchasers of the latter countries.

The National Tube Company, Pittsburgh, Pa., has inquiries out and is placing orders in this market for its large plant at McKeesport, Pa. It will be remembered that the company has been making some extensive additions to its already large plant there, and the buying is for those improvements. The buying, it is understood, covers a general line of equipment, including machine tools and power apparatus.

The New York Central & Hudson River Railroad is to build a small repair shop in New York, at a cost of \$12,000, which will be about 42 x 62 ft., and some inquiries in the market indicate that a small list of machine tools will soon be placed for equipping the plant. It is understood from inquiries out that the company's machine tool equipment will be operated by variable speed motors. It is known that this company has been quietly purchasing some machinery of late which is held in reserve to equip some shop additions now under way.

Some inquiries have been placed in this market by the El Paso & South Western System, which is understood to be making some improvements. R. S. Fitch, El Paso, Texas, is doing the buying.

The Pullis Iron & Steel Works Company, St. Louis, Mo., has prepared plans for a new building 100 x 300 ft., for the equipment of which it will require lathes, riveters, punches, shears, &c. The machinery will not be purchased until the plant is ready for the equipment. Thomas R. Pullis is president.

The Virginia Blower & Mfg. Company, Richmond, Va., which was recently incorporated for the manufacture of the blower system of heating, ventilating, dust collecting, &c., has not yet decided upon the machinery it will require for equipping its new plant. The main building will be of corrugated galvanized iron, 50 x 100 ft., to front on a siding from the Southern Railroad. There will also be an office building, 25 ft. square, of which a drafting room will occupy one-third of the space.

The New York Edison Company has decided to suspend for the present the construction work on its new power house at 201st street and the Harlem River because of existing financial conditions. The company has laid the foundation for the structure, and while it is admitted that some time the building will be erected and put in commission, it is stated that for a time at least nothing will be done on the work. While it is understood that some contracts were practically agreed upon, it is stated that none of the machinery equipment for the building was arranged for. No announcement has been made as to the size of the proposed power plant, but it was stated that it would be probably as large as the company's big waterside stations, and it is safe to say that the trade will be obliged to forego the opportunity of bidding on machinery contracts amounting up into the millions. It is stated that for the immediate future the requirements for the company can be abundantly met from its power houses known as Waterside No. 1 and Waterside No. 2, located at Thirty-eighth to Fortieth streets and the East River.

The Genesee Amusement Company, Rochester, N. Y., has had inquiries in this market for some power equipment, aggregating about 150 kw., and additional electric equipment for lighting purposes. The Galbut Gypsum Company, also of Rochester, N. Y., has inquiries out for about 100 kw. of power equipment.

Joseph T. Castle, Irvington, N. J., has inquiries out for an ice making plant. The specifications include a power plant of about 200 hp.

Chicago Machinery Market.

CHICAGO, ILL., October 1, 1907.

Measured in totals of actual shipments for the month, the August record in practically all machinery lines ranked well up to and in some instances exceeded that of the preceding year; but it is hardly expected that September will make so favorable a showing. True, there are still many shipments yet being made on orders placed months ago, but the volume of these must gradually decline as time advances. Since the amount of new business coming in is at best not increasing, there is no reason to expect the continuance of a parity in volume with that of one of the most phenomenal

years in the history of the industry. Manufacturers have grown so accustomed to accumulated orders providing for their output far in advance that they naturally view a return to a more even balance between supply and demand with misgiving, but a careful review of the situation is sufficient to dispel such apprehension. While the expectation of somewhat modified activity through the three succeeding months now generally prevails, there is every assurance that the net result will mark 1907 as a year of exceptional prosperity. Even assuming that no further stimulus will be added to the present movement the outlook would still be far from discouraging, for there are enough orders developing to hold the market above the imputation of absolute dullness. Among the machine tool dealers it is noted that sales of the past week have included a number of large tools shipped from stock. Mexican mining interests were among the purchasers of such equipment, and orders from diversified industries for one or more tools were filled in like manner. Local users were particularly conspicuous among buyers in the market during the week. Chief among these was the Chicago, Lake Shore & Eastern Railway, a list of whose requirements was given in these columns in the issue of September 12. It is understood that orders for practically all this equipment have been placed.

Special interest attaches to the renewal of activity in the building plans of the Corn Products Company, which since early in the spring have been held in abeyance. These plans contemplate the construction of an extensive glucose plant at Summit, Ill., near Chicago, for the equipment of which a large amount of machinery of various kinds, including some machine tools, will be required. Nearly all of this was figured on some months ago, but no purchases were then made. Inquiries for structural material have recently been made, and machinery interests are expecting an early renewal of negotiations for this equipment.

The Wm. Garschow Company, 12 South Clinton street, Chicago, will remove to its new building, now approaching completion, at the southwest corner of Morgan and Washington streets, which will be ready for occupancy in about six weeks. This building, which has been specially designed for machinery work, is of brick, five stories and basement, mill construction, and is 80 x 125 ft. The first and second floors will be devoted to the company's uses in the manufacture of gears and machinery work. The remaining four floors of this building will be occupied by the Monarch Telephone Mfg. Company, maker of telephone apparatus, now at 12 South Clinton street. For the equipment of this enlarged space the company will require and is in the market for motors and some special machines, shafting, hangers, pulleys, &c. Within a few months other tools, such as screw machines, punching presses and drills, will also be needed.

The Superior Iron Works Company, Superior, Wis., is enlarging its blacksmith shop by an addition 31 x 66 ft., built of concrete blocks. To supply this additional space the company will require a belt driven power hammer, a punch and shear, and possibly an additional forge.

The Kohler Die & Specialty Company, Chicago, maker of dies, punches and special machinery, which for a number of years has occupied space in a machinery building, 34 South Canal street, is erecting a three-story reinforced concrete building, 100 x 100 ft., at Green and Washington streets, which it will occupy about November 1. Besides affording needed room for the business, which has outgrown its present quarters, the new building will provide superior advantages in the way of light and improved facilities for the manufacture and handling of its product. The addition of three more stories is contemplated later on, the foundation and walls of the present structure being designed with this end in view. Tools and machinery equipment for present needs have been purchased.*

As the work of dismantling the building now occupying the prospective site of the new Northwestern Depot progresses, the remaining machinery interests and supply houses along this portion of Canal street are gradually being dispersed. In most instances more commodious quarters with improved facilities have been selected in various sections of the West Side, and while the compactness of these interests which gave the name of Machinery Row to the three blocks of Canal street between Lake and Randolph streets has been destroyed, it has resulted in many important improvements. The Chicago Belting Company, manufacturer of leather belts, now at 69 South Canal street, will shortly remove to a new building of reinforced concrete construction which it is erecting on Green street, between Randolph and Washington boulevard. The company will occupy two of the six stories of the building, the remaining floors being designed to accommodate machine or other manufacturing industries.

The Northern Engineering Works, Detroit, Mich., has recently furnished two alternating current electric cranes, of 30 and 25 tons capacity respectively, 58 and 39 ft. span, to the North Shore Electric Company for use in its new power stations at Waukegan and Blue Island, near Chicago. The larger of these cranes is equipped with an auxiliary high speed alternating current hoist. A similar installation of an 8-ton 32-ft. span Northern traveling crane was recently

made by the company in the Spearfish, S. D., plant of the Black Hills Traction Company.

The National Blower Works has secured the contract for the heating apparatus in the Johns-Manville Company's West Side mill at Milwaukee. It will be what is known as a galvanized hot blast furnace, and will be used both for drying and heating. The company is also at work on a heating furnace for the new pattern shop of the Vilter Mfg. Company, Milwaukee; large leather drying furnace, Rueping Leather Company, Fond du Lac, and also a dyeing apparatus for the Athens Improvement & Mfg. Company, Athens, Wis.

The Falk Mfg. Company, Milwaukee, has begun work on a large contract for gears and pinions for the Interborough Rapid Transit Company, New York. The machinery furnished will be extra large and will be used on the heavy motor cars which pull the Subway trains.

The Cincinnati Electrical Tool Company, Cincinnati, Ohio, announces the opening of a Western office and warehouse for the sale of its electric tools at Eighteenth and Rockwell streets, Chicago, with Oscar P. Wodack as manager. Mr. Wodack has had a wide experience in handling electrical goods and the success of this branch of a rapidly growing business is assured.

An error was made last week in referring to the Rust Boiler Company's contract for boilers at the Joliet plant of the Illinois Steel Company. The Rust Boiler Company is located at Pittsburgh, Pa., its general office being in the German National Bank Building, Sixth avenue and Wood street. The same design of boiler will be installed at the Joliet plant as those which the Rust Boiler Company installed at the South Chicago plant of the Illinois Steel Company, with the exception that at the Joliet plant the boilers will be arranged to make use of the waste heat from the coke ovens or to be fired with coke breeze.

Cleveland Machinery Market.

CLEVELAND, OHIO, October 1, 1907.

The local machine tool market is practically unchanged from a week ago, although some dealers report a slight improvement. While sales are a little more numerous than they were during the early part of September, the improvement that had been expected at the beginning of fall has not materialized, and dealers do not now expect that there will be much, if any, change in conditions during the next few weeks. The stringency of the money market is still regarded as the principal cause of the continued quietness in the machine tool market. Conservative manufacturers are not tying themselves up with obligations which they may have trouble to meet later, but which under ordinary circumstances they would have no difficulty in taking care of by securing loans. Complaints from manufacturers that collections are poor are frequent. They say that some of their customers, among them large concerns, that have been in the habit of discounting their bills are now slow in paying them when due.

The machine tool sales of the past week have been limited mostly to single tools to replace old ones. There are no inquiries in the market for good sized requirements, with the exception of two for extensions to plants that were reported last week, but for which contracts have not yet been closed. A number of plants are planning small additions, but their machinery requirements will not be large. Some of the automobile builders are occasionally placing an order for one or two machine tools, but the demand from this source is expected to be light this year as compared with the last two or three years. Although a number of interurban traction lines were projected in Ohio this year, construction of them has been delayed in most cases because of the difficulty to float bonds owing to the financial situation.

Foundries continue to have about all the work they can do, but the present unsettled condition of the pig iron market is making the situation unsatisfactory to foundrymen, who are unable to make contracts for next year. Users of castings are in the market with inquiries, but are unwilling to make contracts based on the present prices of pig iron. A few contracts are being placed, the price to be fixed later, being based on the price foundrymen will have to pay for pig iron.

The Rickersberg Brass Company, which was recently incorporated, with a capital stock of \$50,000, by E. Rickersberg and others, has secured a site and commenced the erection of a new plant on East Thirty-seventh street. The company intends to have one of the most up to date plants in the country for the manufacture of plumbers' brass goods and brass specialties. It is expected that the plant will be ready for operation about January 1. The company has purchased its brass working machinery, but has not yet placed its order for furnaces and engine and boiler. A separate power plant will be erected, in which will be installed an engine of about 150 hp.

The Superior Foundry Company is completing large additions to its plant and expects to have them ready for opera-

tion by October 15. The company is erecting a main building, 176 x 190 ft.; finishing rooms, 56 x 280 ft. and 56 x 150 ft., and a storage vault, 25 x 65 ft. One new cupola will be installed. The new plant will be up to date in every particular. The additional capacity will be largely used for the piano frame department, the company expecting to turn out 450 piano frames per day when the new foundry is in operation. The additions will increase the present capacity of the plant from 80 tons to 120 tons per day.

The McMyler Mfg. Company has recently received orders for the erection of two large car dumpers at Lake Erie ports. One of the dumpers will be built for the Baltimore & Ohio Railroad at Lorain, Ohio, and the other for the Hocking Valley Railroad at Toledo. It is expected that the dumpers will be erected and ready for operation at the opening of navigation next spring. This company has also received an order for a large revolving locomotive crane to be built for the Hamilton Steel & Iron Company, Point Edwards, Ontario. The crane will carry a 3-ton ore bucket. The company is now building a large crane for the United States Government at New Orleans, to be used in building levees along the Mississippi River. The crane has a radius of 80 ft. and is equipped with orange peel buckets. With this and other smaller work on hand the plant is taxed to its fullest capacity.

P. J. Brown, contractor and builder, who makes a specialty of blast furnace and rolling mill brickwork, has removed to new offices at 414 New England Building. Mr. Brown has just closed a contract with the Upson Nut & Bolt Company to build a new stove at its River Furnace, Cleveland.

The Grasselli Chemical Company is making some additions to its plant, including the erection of a small power building, in which will be installed 500 hp. boilers of the Babcock & Wilcox make.

The Board of Managers of the Ohio State Reformatory, Mansfield, will receive sealed proposals until October 16 for furnishing and erecting complete an ice making and refrigerating plant of from 10 to 12 tons capacity, to be installed in the reformatory building.

The new foundry building, pattern room, erecting and blacksmith departments that are being erected by the John F. Byers Machine Company, Ravenna, Ohio, are nearing completion and will be ready for use in November.

New England Machinery Market.

WORCESTER, MASS., October 1, 1907.

Customers still seem to be holding back in placing their orders for machine tools, very little change having been noticed in this respect by dealers and manufacturers. The week has been uneventful. It has been punctuated with small orders and numerous inquiries, but there has been nothing worth noting in the way of the placing of large business. September totals have not been as large as had been expected, yet they were by no means small, excepting by comparison with some of the great months which preceded them. There are encouraging signs enough, among them the fact that several large companies that have been holding up appropriations for machinery and other equipment, have now voted the necessary funds, which should mean large orders in the very near future. No further cancellations are reported. The effect of the automobile builders' failures is wearing off, and that trade is regarded with more of optimism. While everyone recognizes the fact that there has been a decline in business in practically every manufacturing line, yet the general tone is one of cheerfulness. Most observers of conditions agree that business should pick up noticeably within a few weeks, and it is certain that it would require no very great improvement to make it entirely satisfactory to most manufacturers, though only the most hopeful believe that it will reach a point equal to the height of last season's unprecedented prosperity, at any rate, not this year.

The machine tool builders are receiving orders right along, although more slowly than formerly. Most of them would not feel it in their manufacturing departments if no new orders were booked before January 1, and some of them have orders enough on their books to keep them running full well into next year. Of course old business is being constantly augmented by new. Manufacturers are catching up on deliveries quite rapidly, however. With better deliveries a marked increase in foreign business is expected, this being one of the factors that is at present working against business with other countries, it is believed, as well as with the domestic trade.

Collections are not at all good, and are a source of some annoyance, though not to a serious extent, excepting in some few isolated instances. Machine tool builders are receiving occasional requests to take notes in lieu of promised cash payment, and in some cases 6 per cent. interest is offered, a high rate for this class of paper. This condition all goes

back to the money market, and the consequence is reluctance of banks of some sections to continue loans to the same amount as they have been carrying for customers.

The Kinney Mfg. Company, room 921, Colonial Building, Boylston street, Boston, is equipping a machine shop at 67 Sudbury street, in that city, for the manufacture of a new type of steam engine, details of which are not yet ready for announcement. The company is organized to manufacture marine and stationary engines and electric machinery. J. Royal Kinney is president, and associated with him is A. B. Raymond of the firm of Swazey, Raymond & Pierce, naval architects. Sufficient equipment for present needs has been installed, and the initial machines are in process of building.

The Carriage Gear & Wheel Company, Merrimac, Mass., whose works were recently destroyed by fire, has decided that the plant will not be rebuilt at Merrimac.

The Arcade Malleable Iron Company, Worcester, Mass., has been reorganized and is making extensive changes and improvements in its works, with the purpose of putting its business on a strictly modern basis. New officers have been elected. Edward B. Dolliver, treasurer of the Standard Screw Company and manager of the Worcester Machine Screw Company, has been elected president; Alonzo G. Davis, cashier of the Merchants' National Bank, treasurer, and H. Paul Buckingham, secretary, these officers and George M. Albee and Abbie Buckingham constituting the Board of Directors. George C. Belcher, who has been in the malleable iron business all his life, and who until recently was head of the Belcher Malleable Company, Easton, Mass., has been made superintendent. The present works at Washington square will be vacated as soon as the company's other foundry plant has been put in shape to receive the business. The change would have to be made within a year or two, because of the taking of the site of the present foundry for railroad purposes, and the new management thinks it the best policy to establish the new works without delay. They will have a capacity of 50 molders. The business is an old one, having been established in 1850 by Warren McFarland, who was later succeeded by the late George B. Buckingham.

Work on the new Cape Cod Canal has started at the plant of the Keith Mfg. Company, Sagamore, Mass., in conjunction with the building of the new plant of that company, work on which is now well under way. Great buildings will be occupied for the manufacture of steel freight cars, and the proximity of the canal will afford a great advantage in economical production. The company owns a tract of land extending some half a mile along the New York, New Haven & Hartford tracks on the one side, while the canal will skirt the property on the other, affording water shipment of fuel and material, while the railroad will take away the completed cars. An arrangement has been made between the Keith Company and the canal people, by which material excavated from the great ditch is used in filling land for the new buildings. The two main buildings are, respectively, 60 x 1100 ft. and 60 x 900 ft., while the power house will be 150 x 400 ft.

James Smith & Son, Hope avenue, Worcester, Mass., have established a shop where they will manufacture a machine known as the Noble comb, used in the manufacture of worsted goods. It is said that 90 per cent. of these machines are now imported from England.

A change in ownership of the business of the Worcester Metal Goods Company, 14 Hermon street, Worcester, has been effected, by which Edwin Brown, formerly of the American Card Clothing Company, becomes president, and Caspar M. Brown, secretary. W. D. Grout, recently with the Spencer Wire Company, will continue his connection with the company as an expert in this class of manufacturing small metal goods. The business was moved to Worcester about a year ago from New Haven, where it had been carried on for years by the Grilley Company.

New England shipyards have fared exceedingly well in the apportionment of new work for the Navy Department. The Bath Iron Works, Bath, Maine, have been awarded the contract for two of the new destroyers. The Fore River Shipbuilding Company, Quincy, Mass., will not only construct the new 20,000-ton battleship North Dakota, but it will build the seven submarines, the contract for which has been awarded the Electric Boat Company, New York, under conditions which it is presumed will be fulfilled, governing price and an increase in speed over the provisions of the bid. Four of these boats will be of the Octopus class, and the remainder of the same Holland type but of larger displacement. The department will reserve a minor part of the \$3,000,000 appropriation for submarines in order that a boat of some other type may be constructed if considered advisable.

The promised prosperous period of shipbuilding activity, of which the naval work forms the nucleus, counteracts to an extent the effects of the belief that the removal of the battleship fleet to the Pacific will have a serious effect upon the Boston and Portsmouth navy yards, which naturally will have much less work to do, and consequently will probably not be increased in their shop capacity.

The New York, New Haven & Hartford Railroad makes

the announcement that the chief purpose of the proposed issue of \$35,000,000 of new stock is the purchase of freight cars and other equipment, as has already been alluded to briefly in this column. The principle reason for such enormous increases in freight cars is the action of the American Railroad Association, from which the New Haven Company has now withdrawn because of the new rule increasing the per diem charge for cars of one railroad while on another system from 25 to 50 cents. As a consequence of the withdrawal it is understood that the association has intimated to the New Haven people that they may be required to pay a per diem charge of 75 cents to \$1. This fact, coupled with the four days' allowance in New England for unloading of cars before demurrage charges begin, has compelled a very great increase in the system's freight car equipment. When these cars are delivered it will undoubtedly be necessary for the company to make a corresponding increase in its repair shop facilities, and it is believed that the proposed shops to be erected at the western end of the system, probably in or near New Haven, will include car shops as well as locomotive shops.

G. E. Hoglund, who has been manager of the works of the Gardner General Foundry Company, Gardner, Mass., has purchased of that company the equipment and supplies of the foundry on Sanborn street, formerly the Gardner Foundry, and will conduct it as an independent concern. R. N. Wiley, treasurer of the Gardner General Foundry Company, has been made manager, to succeed Mr. Hoglund, and will be assisted by John Hamill, for several years foreman of the Central Oil Stove Company's foundry, as foreman in charge of the molders. The company is adding new equipment, and plans to make some additions and alterations to its foundry immediately, to increase the efficiency of the plant and the convenience of the men.

The Springfield Elevator & Pump Company, Springfield, Mass., has purchased a tract of land at Hartford, Conn., between Windsor street and the Hartford Division of the New York, New Haven & Hartford Railroad, and plans to build a factory on the site this fall. The company states that it already has in its present plant the necessary equipment for installation in the new shop, so that it will not be in the market for new machinery at this time. No power plant will be installed, as it is proposed to operate its machinery by electricity. Consequently its immediate requirements will be limited to shafting and hangers. The company manufactures hydraulic, electric and belt power elevators and steam and power pumps.

The Springfield Metal Body Company, Springfield, Mass., manufacturer of aluminum automobile bodies, fenders, &c., has awarded the contract for its new factory, which has already been noted. The building will be 50 x 100 ft. and three stories.

Nichols & Stone, Gardner, Mass., manufacturers of chairs, have decided to rebuild their large factory recently destroyed by fire, and state that work will begin immediately. The machinery was a total loss.

Philadelphia Machinery Market.

PHILADELPHIA, PA., October 1, 1907.

While it is too early to obtain any definite information regarding the comparative volume of business transacted in the local machinery market in the month of September, it is quite evident from the weekly reports of many manufacturers and merchants that the total will not develop into very large figures. Early in the month some fairly good business was placed, but there was a general falling off as the month advanced, and the last half the volume of business diminished quite materially. Buyers in most cases have been placing orders only for immediate requirements, and the tendency to withhold purchases of tools in any quantity and for extended future delivery has been pronounced. Prospective purchasers of tools appear to be looking as far ahead as possible before placing orders; the more or less unsettled condition of business generally, as well as unsatisfactory financial conditions, being largely responsible for this, and it is believed that until it is possible to see a reasonable surety of improved conditions ahead, there will be a certain amount of hesitancy shown on the part of some buyers to place definite orders. That a better feeling prevailed in this respect during the closing days of the month was evident from the increased volume of new inquiries which came before the trade, and while most of these have been single tools and small lot propositions, one or two of fair size give promise of early development.

Sales of machine tools during the week just closed were a shade better than the previous week, and the major portion of the orders taken were, as has been the case for some little time, mostly single tool propositions. One fair lot of tools, which has been held in abeyance for some months,

was finally closed, the equipment being distributed among some three or four merchants and manufacturers. Another fair lot will probably be ready for closing at an early date, while some very satisfactory new business is expected to develop very shortly. The railroad demand shows some improvement. The Pennsylvania Railroad has sent out additional specifications for a number of tools, largely for replacement, while a few orders from some of the other roads have been booked for standard as well as special tools.

Manufacturers as a rule still keep fully occupied, and although new business has not been coming in very rapidly of late, orders which have been on the books are still sufficient to keep plants pretty well filled. Unless new business develops somewhat more rapidly, however, there is a possibility that some plants will have to adopt the policy of retrenchment before a great while. As a rule tool builders would be perfectly satisfied if just enough new business would develop to permit them to maintain their organized working forces and give them some respite from the extremely busy conditions which have prevailed for some time.

The foreign situation remains unchanged, and but little business that can be taken in competition at the ruling prices is coming out. Some fairly good orders for special tools and equipment have been taken by manufacturers of such lines, but little has been done in the so-called standard machine tool lines.

Boilers and engines continue more or less inactive. Some very satisfactory business is under consideration, but actual orders are rather slow in developing. Second-hand boilers and engines appear to be governed by the same conditions, and the amount of new business closed is not large.

Second-hand machine tools and machinery have taken on a little more activity. Stocks on dealers' hands are not very large in some lines and sizes, particularly heavy tools, for which there appears to be a better demand. Quick sales have been confined, as a rule, to the smaller sized equipment.

The demand for iron and steel castings is weaker. Some foundries still have their capacities pretty well taken, but the active solicitation for orders shows others to be in need of business. Deliveries on machinery castings are better, and on some lines can be had very promptly. Steel casting plants, while fairly well occupied at the time, are short of orders for future delivery.

The Rivetless Chain & Engineering Company, which was recently organized, will shortly locate a plant at Lebanon, Pa., where the company is said to have purchased a 10-acre tract of land on which several buildings are to be erected. The present offices of the company are located in the Mann Building, Lebanon, Pa., where information regarding the plans of the company can be had from its secretary, H. U. Spessard.

The Department of Public Works, Philadelphia, will shortly ask for bids on some extensive equipment in connection with the extension and furtherance of the new system of filtration of the water supply. On some of this work bids are now being asked and proposals will be received by Director George R. Stearns until noon, October 22, for the following: Under contract No. 109, electrical equipment for the Torresdale filters; contract No. 126, pumping engines for the Lardners' Point pumping station; contract No. 127, boilers for the Torresdale pumping station; contract No. 128, centrifugal pumping engine for the Torresdale pumping station, and under contract No. 134, magnesia covering for piping and equipment at the Lardners' Point pumping station. Specifications, drawings and blank proposal forms for bids under the above contracts may be obtained from the Chief Engineer, Bureau of Filtration, room 712, City Hall.

The contracts for an engine and boiler house for the new leather manufacturing plant building for C. J. Matthews & Co. at Langhorne, Pa., have been let by Ballinger & Perrot, architects and engineers, to Cyrus E. Smith, Hulmeville, Pa. The building will be 45 x 50 ft., and will house two 66 in. by 16 ft. boilers, providing steam for a Corliss engine. A steel stack will provide draft for the boilers.

The Vandyke Churchill Company, which recently moved its local branch office from the Bourse Building to 917 Arch street, has been appointed sales agent in the Philadelphia territory for the line of tools manufactured by the Geometric Tool Company, New Haven, Conn., and the local stock has been transferred to its Arch street showrooms. The Vandyke Churchill Company has now become fully established in its new quarters, and reports an increased number of inquiries for machine tools. Recent orders, however, have been largely confined to single tool propositions.

Thomas H. Dallett & Co., Inc., note a good demand for pneumatic machinery, particularly stone working tools, for which orders have been booked from both foreign and domestic customers. There is some good business in motor driven boiler shell drills, as well as portable drills in sight, while the demand for the new Dallett air hose coupling device has been very large. This coupling, which was recently illustrated in *The Iron Age*, is meeting with exceptional favor, and the manufacturers have been taking some very satisfactory orders.

The Royersford Foundry & Machine Company, Royersford, Pa., continues to operate its plant at the full capacity.

A good volume of business is still on the books, and while new orders are not developing as rapidly as some months ago, a number are coming in which will enable the plant to be kept fully occupied for some time to come. Recent orders include a large motor driven punch and shearing machine for parties in Washington, D. C. A double punch and shear has recently been furnished to the H. W. Middleton Company, Philadelphia, while a like machine has been supplied the Lehigh Portland Cement Company for its Belleville, Ontario, plant. Business in power transmission machinery and equipment is also reported good, and a large number of miscellaneous deliveries have been recently made.

The Link Belt Company is particularly busy in its estimating department, there apparently being but little let up in the demand for its various lines of conveying and elevating machinery. New business, however, does not develop as rapidly as earlier in the year, although sufficient orders are being taken to keep the plant working to its capacity. Recent orders include some very extensive equipment, among which is a Dodge system coal storage plant of 240,000 tons capacity, for the Lehigh Coal & Navigation Company at Hauto, Pa.; a telpherage coal handling plant for the Mobile Light & Railroad Company, Mobile Ala.; sugar handling machinery for export to Formosa, Japan, and a retail coal pocket and coal handling plant for the Roebling Company, Roebling, N. J. The Link Belt Company has just completed and put into operation an extensive elevating and conveying system for freight handling at the Lehigh Valley Railroad terminal at Jersey City. This includes nine separate elevating systems of the Link Belt automatic type for handling barrels, sacks, packages, &c. An extensive system of conveying and handling machinery has also been installed in the oil cloth plant of the Farr & Bahey Company, Camden, N. J. A heavy standard gauge electrically operated street railroad crane, for handling materials of various kinds, has been furnished the Rapid Transit Company of this city, while several large coal pockets for railroads in this territory are also in course of erection.

Cincinnati Machinery Market.

CINCINNATI, OHIO, October 1, 1907.

The advent of October brings a more confident feeling among the tool manufacturers, and in certain lines there is a distinct and very satisfactory increase of inquiry—inquiry which has developed business. This, however, is confined for the most part to the manufacturers who cater particularly to domestic trade in the line of drills, shapers and the like. One of these, seen during the week, reported himself as especially pleased over the booking of a nice lot of small orders for tools needed at once in shops where work was being done for the makers of machinery used in the cotton and car building districts. This same authority says he had more inquiry during the past two weeks than for a year previous from the small dealers. This machine tool market has been entertaining visitors, who sought small lots of tools and, in many instances, second-hand machinery, for several weeks. The readiness with which these purchasers placed orders for immediate deliveries on such tools as they could buy from the dealers' floors or at the shops has been eminent- ly pleasing.

There have been some good inquiries from dealers, both foreign and domestic, with the preponderance still, however, in favor of Europe. The depression in the money marts brought about by extensive operations planned by the railroads, and the movement of heavy crops, coupled with the usual uncertainty of a vigorous Presidential campaign, seems to have retarded domestic inquiry. A very pleasing testimony is that of one of the largest of the downtown tool manufacturers, who announced with emphasis that the month of August was the largest in matter of output in the history of the concern, with September a close second. This concern has enough business on its books to keep the plant running to its greatest capacity until March, so with the inquiry that has already commenced, and considering the indulgence of dealers and others in withholding cancellations, little fear is felt for the future.

A large machine tool concern outside the Cincinnati District, but in the Ohio tool producing belt, visited during the week, presented an extremely busy picture. Running to fullest capacity, with no intermissions through strikes or other causes, it is still behind on orders, three and four months on deliveries of some machines, and eight and nine months on others. Citing one instance from the files of a commendable form of what might be termed "foreign indulgence," the manufacturer read an order for machines from England under date of January 13, 1906, on which shipment was made September 19, 1907. This same concern made a shipment during the week of the 16th of a car-load of tools consigned to Germany, England, France, Italy and Japan, and will duplicate the shipment this week. An

interesting incident of the early year with this institution was the visit of a buyer who maintained an incognito in the cash purchase of 28 lathes for European consignment, routing and reshipping them himself from New York. Shipment on this order was made in April.

As a rule, the situation with reference to manufacturing of steel and iron building and specialty material in this section is very encouraging. Reports from these indicate that they are running full capacity; a number are contemplating extensive improvements and additions, and there are some new concerns just entering the field, as the Ohio Steel Foundry Company at Lima, Ohio, for instance, which poured its first heat September 21, and was witnessed by members of the Lima Progressive Association, who subscribed to the fund, and members of the press, and was altogether a most successful introductory; the enterprise of the American Rolling Mill Company at Middletown, which has increased its capital stock \$200,000 to take care of improvements already under way—these improvements being an enlargement of their open hearth department, and practically all the subsidiary departments; the extensive additions and improvements made by the Schreiber Company in its new plant in Norwood—these and many others of smaller caliber indicate the trend of the times toward bigger and better things hereabouts.

It is expected that something definite will develop during the coming week in the matter of the Cincinnati Steel Foundry Company, now in the hands of Receiver Wm. B. Melish.

The Hamilton Otto Coke Company, Hamilton, Ohio, is making extensive preparations for enlarging and continuing its business, which was put out of commission July 6 through damage to the condensing house. A contract has just been let to a prominent concern of Camden, N. J., for the installation of machinery to carry 100 ovens. The present capacity is but 50 ovens, and the repair work on these is expected to be finished so that it may operate them by December 1. The company is enlarging to meet the expected demands for coke that will be created by the new blast furnaces now in process of erection at Cokeetto by the Hamilton Iron & Steel Company. Edward N. Ohl of Pittsburgh, vice-president of this company, was a visitor during the week.

Local manufacturers of foundry supplies report business in excellent shape, with good demand for all standard materials used in the work.

An interesting event of the late week among foundrymen was the lecture by Prof. John J. Porter of the metallurgical department of the University of Cincinnati before the Cincinnati branch of the Associated Foundry Foremen of America on "Foundry Alloys." A dinner preceded the talk.

Steam engineers throughout Ohio are meeting with representatives of the State Federation of Labor, in Columbus, this week to consider the advisability of forming a State organization of the International Union of Steam Engineers. Representatives of various unions throughout the State are to be in attendance. Chas. H. Wirmel and George Barnes are the local delegates.

Members of the Engineers' Club of Cincinnati met Saturday afternoon in regular session and as an educational feature inspected the work now in progress by the Government at Fernbank, on the Ohio River.

There were but very few cancellations encountered on the visits of the writer the past week, and these were practically confined to the West and Central West. Inquiry from the St. Louis territory is exceptionally good. This is also true of coast business; in fact, to judge from reports of local tool manufacturers, there is a very confirmed awakening on in the San Francisco District.

The Cincinnati Punch & Shear Company reports good demand for the larger types of its product, a late sale being a 14-ft. roll bender of 35,000 lb. to the Edison Company, to be shipped East.

The Cincinnati Chuck Company, an enterprise of Phil Fosdick, of the Kern Machine Tool Company, C. F. and A. P. Kern of the same institution, and R. K. Le Blond of the R. K. Le Blond Machine Tool Company, will be located in the second floor of a new brick building now going up at the corner of Spring Grove avenue and Sassafras street, in the heart of the machine tool district.

Steubenville, Ohio, business interests are co-operating with the inhabitants of Follansbee, a nearby village, in creating sentiment for the building of a number of new open hearth furnaces in the Follansbee Steel Plant. It is unofficially reported that the improvements are a part of the programme for 1908.

The plant of the M. L. Hayden Company, in Columbus, is busy with orders for automobile parts, and a department is devoted to the building of automatic stokers for locomotives. One is now under construction for experimental uses on the Great Northern Railroad. It is hoped that good business will result from the trials.

The purchase of the old Mitchell Tranter properties in Covington by McDonell & Co. of Allegheny, Pa., for \$37,000, the intention to dismantle the property and break the ma-

chinery up into mill scrap, &c., has been told in the columns of *The Iron Age*, but there is a little outgrowth, so to speak, of that transaction, indirectly, that has not been made public as yet. This is the enterprise of the Cincinnati Iron & Steel Company, which is backed by such men as E. H. Busch, president of the Cincinnati Iron Store Company, and others of like importance in the iron and steel world. Mr. Busch is not ready to talk about the enterprise save in a general way, and at this time it can only be stated that the plant will be erected some time in the spring and that the rolling mill will have a capacity of something like 3000 tons a month. It is understood that the people under discussion were unsuccessful bidders on the Mitchell Tranter property. It is unlikely that the new mill will be built on Kentucky ground.

Government Purchases.

WASHINGTON, D. C., October 1, 1907.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until October 15 for the following machinery for various navy yards: Nineteen induction motors, one pneumatic drill, six pneumatic hammers, one adjustable dado machine, two upright drills, two sensitive drills, two steering engines, one scrap metal furnace, one wet twist drill grinder, one tool grinder, one emery grinder, one steam hammer, one wood turning lathe, one flat turret lathe, five engine lathes, one screw cutting engine lathe, two mortising machines, two wood planing machines, two universal milling machines, one bolt threading and nut tapping machine, one universal milling machine, one duplex milling machine, one buffering and strapping machine, two screw machines, one cold sawing machine, one slotting machine, one metal planing machine, one grinding and cutting off machine, two punching and shearing machines, one scroll sawing machine, one bolt heading and forging machine, one valve reseating machine, one ratchet drilling machine, one hand drilling machine, one boring and turning mill, two complete drilling outfits, one power press, one hydrostatic press, one drill press, one hand planer and jointer, one combined scroll and resaw machine, one steam windlass.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until October 8 for the following machines, League Island Navy Yard: Schedule 312, planer and matcher, band saw, molding and scroll machine, planer and jointer, rip saw, smoothing planer; schedule 349, electric and air drills, air hammers; Norfolk Navy Yard, schedule 349, pneumatic drills; Pensacola, schedule 334, motors.

The Isthmian Canal Commission will receive bids until October 21, circular No. 393, for a quantity of supplies, including pumps.

The following bids were opened September 24, for supplies for the navy yards:

Bidder 3, Abbe Machinery & Supply Company, New York; 14, Brown & Sharpe Mfg. Company, Providence, R. I.; 18, E. W. Bliss Company, Brooklyn, N. Y.; 20, Bullard Machine Tool Company, Bridgeport, Conn.; 24, Bethlehem Steel Company, South Bethlehem, Pa.; 59, D'Olier Engineering Company, Philadelphia, Pa.; 71, W. H. Foster, New York; 82, General Electric Company, Schenectady, N. Y.; 87, R. W. Geldart, New York; 144, Lincoln Motor Works Company, Cleveland, Ohio; 153, Merrill Bros., Brooklyn, N. Y.; 162, Manning, Maxwell & Moore, New York; 164, Manhattan Supply Company, New York; 165, Motley, Green & Co., New York; 172, Northern Electric Mfg. Company, Madison, Wis.; 175, Niles-Bement-Pond Company, New York; 223, Smith-Cortney Company, Richmond, Va.; 232, Toledo Machine & Tool Company, Toledo, Ohio; 242, Vermilye & Power, New York; 245, Williams, White & Co., Moline, Ill.; 247, Henry H. Worthington, New York; 263, Central Metal & Supply Company, Baltimore, Md.

Class 2. One gun boring and turning lathe—Bidder 24, \$41,895; 175, \$37,250.

Class 11. One steam hammer—Bidder 3, \$1244.40; 162, \$1400; 175, \$1190 and \$2040.

Class 12. One drop hammer—Bidder 3, \$589.50; 18, \$950; 87, \$584.44; 153, \$600; 162, \$950; 164, \$600; 165, \$597.50; 232, \$750; 245, \$870.

Class 13. One trimming press—Bidder 3, \$368.40; 18, \$790 and \$925; 87, \$364.95; 153, \$375; 164, \$375; 165, \$372.50; 232, \$300 and \$310.

Class 14. One sensitive drill—Bidder 191, \$95; 223, \$84.93 and \$93.

Class 15. One boring and turning mill—Bidder 20, \$1797.60; 71, \$2100; 162, \$2275; 175, \$2045; 223, \$1798.

Class 44. Two centrifugal pumps—Bidder 59, \$650; 165, \$700 and \$860; 242, \$291; 247, \$622; 263, \$220.

Class 141. One motor drive outfit—Bidder 14, \$710; 144, \$589.50; 172, \$725.

Class 142. One induction motor—Bidder 82, \$69.

The following bids were opened September 25, circular No. 388, for machinery for the Isthmian Canal Commission:

Bidder 4, Ames Iron Works, Philadelphia, Pa.; 6, Babcock & Wilcox Company, Philadelphia, Pa.; 8, Baird Machinery Company, Pittsburgh, Pa.; 18, Bucyrus Company,

South Milwaukee, Wis.; 20, Buffalo Steam Pump Company, Buffalo, N. Y.; 24, Chicago Pneumatic Tool Company, New York; 25, Cincinnati Frog & Switch Company, Cincinnati, Ohio; 32, Crane Company, Baltimore, Md.; 35, D'Olier Engineering Company, Philadelphia, Pa.; 41, Fox Bros. & Co., New York; 43, Gardiner Governor Company, Quincy, Ill.; 44, General Electric Company, Schenectady, N. Y.; 48, A. D. Granger Company, New York; 56, A. L. Ide & Sons, New York; 57, Ingersoll-Rand Company, New York; 59, M. W. Kellogg Company, New York; 62, Thos. G. Keogh, New York; 64, Kiely & Mueller, New York; 68, Laidlaw-Dunn-Gordon Company, New York; 73, Manning, Maxwell & Moore, New York; 74, Marion Steam Shovel Company, Marion, Ohio; 78, C. L. De Murralt, New York; 79, Nathan Mfg. Company, New York; 80, National Electrical Supply Company, Washington, D. C.; 90, Ohio Blower Company, Cleveland, Ohio; 92, Pacific Engineering Company, Seattle, Wash.; 94, J. H. Pearson, New York; 100, Chas. E. Robidoux, St. Louis, Mo.; 116, Sullivan Machinery Company, Chicago, Ill.; 124, Western Electric Company, New York; 125, Westinghouse Electric & Mfg. Company, Baltimore, Md.; 126, Wheeler Condenser & Engineering Company, New York; 129, H. R. Worthington, New York; 134, Epping-Carpenter Company, New York; 135, Wisconsin Engine Company, Corliss, Wis.; 137, Motley, Green & Co., New York; 141, Excelsior Equipment Company, Pittsburgh, Pa.; 142, Vulcan Iron Works Company, Toledo, Ohio.

Class 1. Twelve steam shovels, type B—Bidder 18, \$163,560, 167 days; 74, \$158,160, shipment 150 days; 142, \$196,464, 240 days.

Class 3. Two cross compound steam condensing and cross compound air compressors—Bidder 24, \$22,380.50, 200 days; 57, \$27,806, \$26,962 and \$20,728, 200 days; 68, \$18,106 and \$18,788, 180 days; 116, \$28,090, 195 days; 135, \$32,072, 120 days.

Class 4. Horizontal water tube boilers, sheet steel smoke box and smokestack, &c.—Bidder 6, \$11,324, 105 days; 48, \$10,202, 180 days; 59, item 32, own specification, \$390, 42 days; 62, item 31, \$62, no time; 64, item 31, \$75, 20 days; 137, \$10,251, \$11,324 and \$11,211, no time.

Class 5. Duplex boiler feed pump, vertical water tube feed water heater, pipe and condenser—Bidder 20, item 34, \$383, 75 days; 32, item 38, \$425, 63 days; 35, item 34, \$560 and \$610, 65 days; 43, item 34, \$260, \$285, \$335 and \$375, item 36, \$135, item 38, \$90, no time; 48, \$6269, 180 days; 64, item 38, \$187.50, 30 days; 73, \$5395.15, 120 days; 90, items 36 and 38, \$472.30, shipment 21 days; 92, \$5398.08, 90 days; 94, item 38, \$895, 20 days; 100, \$5569, 100 days; 126, item 37, \$2970, no time; 129, items 34, 35 and 37, \$3636.17, no time; 134, items 34 and 37, \$4745, 70 days; 137, item 34, \$545, 60 days; 141, item 34, \$620, no time.

Class 7. One tandem compound engine—Bidder 4, \$2300, 135 days; 35, \$2880 and \$2950, 135 days; 44, \$3371, 150 days; 48, \$2785, 180 days; 56, \$2300, 100 days; 73, \$2214, 120 days, and \$3483, 195 days; 125, \$2970, \$3276, \$2818, \$3147, \$2210, \$2712 and \$3199, 120 days; 137, \$2250, 80 days; 141, \$2725, 60 days.

Class 8. One direct current generator—Bidder 44, \$1345, 150 days; 48, \$1965, 180 days; 124, \$1730, 175 days; 125, \$1774, 105 days; 137, \$1825, 100 days.

Class 9. Two induction motors and six transformers—Bidder 44, \$1211, 75 days; 73, \$2168.66, 150 days; 78, item 51, \$624, 30 days; 80, item 51, \$750, no time; 124, \$1896 and \$1706, 165 days; 125, \$1470, 90 days.

Class 10. Rock drills and equipment—Bidder 8, \$30,000, gasoline, 300 days; 25, \$14,766.25, 90 days; 41, \$16,466.25, 98 days; 57, \$16,146.25, 60 days; 79, item 59, \$15, 15 days; 116, \$15,280, 90 days.

Bids were opened at the office of the superintendent of the United States Capitol building and grounds September 21 for furnishing and erecting fans, electric motors and heaters for the ventilation of the office building, House of Representatives, as follows:

American Blower Company, New York, for entire material, \$19,300; time, November 13, 1907.

B. F. Sturtevant Company, Washington, D. C., for entire material, \$18,824; time, November 13, 1907.

The following awards have been made for supplies for the navy yards, bids for which were opened August 27:

Frevert Machinery Company, New York, class 21, one rotary shear, motor driven, \$679.

J. A. Fay & Egan Company, New York, class 22, one motor driven band saw machine, \$1455.

Chicago Pneumatic Tool Company, class 145, two pneumatic hammers, &c., \$94.

Under bids opened August 20 for supplies for the navy yards the Excelsior Equipment Company, Pittsburgh, Pa., has been awarded class 136, one valve reseating machine, \$325.

Under bids opened July 30 for supplies for the navy yards the Babcock & Wilcox Company, New York, has been awarded class 1, two 100-hp. water tube boilers and accessories, \$11,570.

HARDWARE

THE coming meeting at Atlantic City of the two great associations of the trade illustrates some of the changes which are taking place in the methods of association work. The trend is toward the practical rather than the theoretical. Formal and detailed programmes are no longer in favor. Elaborate papers to which the delegates might listen with interest, perhaps with edification, are conspicuously absent. The disposition is to talk less, especially for the public, and to consider in executive session topics of direct and practical significance. The informal discussion of matters, perhaps minor matters, in which something may be accomplished, is preferred to eloquent addresses on great themes from the consideration of which nothing definite would be likely to result. Reports of committees, the recommendations of the officers and the suggestions of the members who are in contact with the real difficulties and perplexities of the trade, bring up many such questions which command the attention of the members in proportion to the confidence which prevails that discussion and association action may accomplish something. There is a general recognition of the fruitlessness of mere talk.

The programmes for the Atlantic City meeting illustrate the tendency just referred to. They give very little hint of the character of the business which will come before the associations. There is no flourish of trumpets in the announcement of addresses, or of the discussion of great questions. It must not on this account be assumed that the associations will pay no attention to matters in which their members are specially interested. But the real work of both associations will be on subjects of which outsiders are given no hint. Matters of more or less importance will doubtless be considered in executive session. The jobbers will take such measures as they can to strengthen their position, and the manufacturers, with more diverse interests and perhaps less confidence that much can be accomplished by means of resolutions, will give due attention to trade conditions or practices which, in their judgment, need correction. It may be hoped that all this will be done in a reasonable and sensible manner with due regard to the rights and interests of other branches of the trade. At the same time it must be remembered that the opportunity for meeting one another, the forming of acquaintance and renewing of old friendships are the great things accomplished at such gatherings. The coming together of the two organizations does, indeed, give the trade the fine spectacle of a notable assembly of representative merchants and manufacturers in a branch of business distinguished for the breadth of view and ability of those identified with it, but the quiet work unostentatiously accomplished, and the social and fraternal character of the gathering give to it, after all, its principal charm and chief significance.

During the year past the Manufacturers' Association has given a good deal of attention to the cash discount question, and it is probable that this will be one of the matters which will come up at the convention at Atlantic City. If goods are purchased subject to a discount for payment in a stipulated number of days, it is certainly right that the purchaser should live up to the terms of his contract. If there is an agreement that 2 per cent. is to be deducted for cash in 10 days, with the understanding that this discount is not to be deducted if payment is

delayed beyond that period, the manufacturers are quite right in insisting that the agreement should be carried out. While there is on the part of the merchants a general acquiescence in the reasonableness of this position, there is some difficulty experienced in having them live up to it in practice. For this the manufacturers have, in large measure, to thank themselves. They have been lax in the interpretation and enforcement of the contract, and the jobbers cannot be greatly blamed that they took advantage of this unbusiness-like laxity on the part of these from whom they purchased. Much, however, has been accomplished, and it is hoped that both associations will take a decided stand in regard to the matter—the jobbers letting it be known that they will refrain from deducting the cash discount if payment is not made in the stipulated time, and the manufacturers aiding them to carry out this good resolution by announcing that they will not permit the discount to be improperly deducted.

Condition of Trade.

The entrance on October with generally favorable conditions for the agricultural sections of the country is strengthening the assurance that crops are to be of sufficient volume to provide a foundation for a continuance of prosperity among the agricultural classes, which will do much to keep up the large volume of business which is essential to the welfare of the manufacturing and commercial interests. While there is to be something of a shortage in the size of the yield, there is little danger of its falling below the average, and it is peculiarly gratifying to note that anything lacking in volume will apparently be made up for in the increased value of the crops. It may be indeed that the present year will establish a new record and the amount realized from these great products be larger than in any previous year. There continues to be throughout the country a considerable stringency in finances, and there are indications that even the smaller trade are feeling something of the effect of this scarcity of money. The advance of the year is indicated in Hardware circles by the changing character of the demand, with the subsiding of calls for summer goods and the increasing business in those belonging to the fall and winter trade. In these lines there is with the coming of colder weather a very satisfactory activity. Preparations for the holidays are also in evidence, as the retail houses are making or completing their arrangements for this business, which is taking an increasingly important place in many Hardware stores. It would appear that in some sections purchases of the finer Cutlery, Silverware and other fancy goods are not made as freely as a year ago, suggesting that there is a disposition to slow up a little preparing for a possible lessening in the demand for this character of goods. During the past week the open changes in price in the Hardware market generally have been few, but there is some evidence of the influence of the heavy decline in Copper and other metals, and also of the condition of the Iron market. Business is referred to by manufacturers generally as showing an improved tone during the past week or two with the continuance of a conservative policy on the part of merchants in regard to purchasing for future requirements. Conditions are such that it is generally recognized as the part of wisdom to keep stocks well assorted and to purchase in sufficient quantities to cover the needs of a fair season's business.

Chicago.

For some time it has been foreseen that in Hardware, as well as other lines, a moderate recession at least must surely follow the cresting height of demand, which was fast overreaching the productive capacities of manufacturers in all directions; and indeed, it was commonly conceded that such a movement would be in the interest of, rather than detrimental to, permanent prosperity. That some shrinkage in the general volume of business is noted is not at all surprising, nor is it wholly without its compensating advantages. Factories are now generally well caught up, and the annoyances incident upon delayed shipments have disappeared, together with the premium prices asked for quick service. Manufacturers are more actively seeking business and rigid adherence to current quotations is not so uniformly held as formerly. The lines most closely associated with Copper were the first and heaviest sufferers in this respect, and readjustment to conform to the new price level for ingot metal is still in progress. Sheets, both Black and Galvanized, show signs of weakness, and it is evident some producers are willing to make slight concessions at least to secure tonnage, but there is a fairly good demand from jobbers' stocks, which are now well supplied. There is still a large consumptive demand for Nails, though it is perhaps a little less insistent than it has been; the same may be said of Barb Wire, though the fall orders have so far been quite up to if not in excess of the average for this period. Sensational reports current during the week of impending industrial developments relating to curtailment of output and reduction of working forces have served to complicate an otherwise natural situation. Despite the fact that such rumors are often wholly incorrect, and if true are usually grossly exaggerated, they nevertheless exert an adverse influence upon market movements. With a good yield of Corn now practically assured, the last element of doubt in this direction is removed, and with the prices ruling for agricultural products it is certain that the purchasing power of this great basic force will not be curtailed.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—Business conditions have changed but little during September, and the demand for goods has been steady and satisfactory. It is the healthy, legitimate requirements of the country that are being met, and in the active conditions that continue to prevail the absorption of goods is so large as to be remarkable. People are busy in nearly all lines of work, and when this is the case "something is doing" and things are active.

We frequently hear something said about the probable "recession" of business, that may be expected to come as the result of the existing financial conditions. Our opinion is that so long as people "keep their heads," and so long as our agricultural and industrial interests prosper, we may expect an active business, and, further, that there will be sufficient funds found to carry it on.

Primarily, we must always go back to the farmer for our base of supplies, and so long as he can raise fair crops and get remunerative prices the country generally is sure to prosper, and the disturbing elements that will come occasionally from undue speculation and "high finance," while they may stand in the way for awhile, cannot permanently and seriously impede the country's progress.

Conditions are now too healthy and favorable for any long interference from these causes to come to stay. We will not always have so favorable crops, coupled with a correspondingly large domestic and foreign demand, and we may then expect harder times, but for the balance of 1907 and the first half of next year the prospects now are good.

It is not a time for speculative ventures or for outlays that can be reasonably avoided. But it is a favorable time for merchants to keep their stocks in good condition and to base the conduct of their business on the policy of keeping on hand the goods which they expect their trade will want.

There has probably never been a time when it was

more necessary than it now is for the active, successful retail merchant to keep his stock full and attractive.

In meeting catalogue house competition this is essential. If his customers know that they may be reasonably sure of being able to get promptly from him the goods they want it is one of the strongest points that he can make and one without which he cannot succeed.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—We are pleased to report that the Hardware business continues good. In the cotton section the farmers are now busy gathering the crop. Crops throughout the South are going to be up to the average, provided we have a late frost. The prices of farm products are high, and the prospects for business are excellent. Of course, if we were to have an early killing frost, it would injure the crops very materially and have a very depressing effect upon business. We have had splendid weather for outdoor work, and everybody who wants to work has been able to find something to do. Taking it altogether, business conditions are quite satisfactory.

We have had a State Fair here this week and "Home Coming," and the city has had the greatest number of visitors that we have entertained since the Tennessee Centennial Exposition in 1897. We have had an opportunity to talk to people from every Southern State, and while crops have been injured by dry weather in a few sections, our opinion is that the crop will be an average one.

Omaha.

LEE-GLASS-ANDRESEN HARDWARE COMPANY.—This market, including other jobbing centers located on the Missouri River, presents no new or particularly interesting features at the present time. Business in all lines is flourishing, and the volume of goods daily going into consumption continues with a steady regularity. The prospects for a large yield of corn are assured, but, although the total volume will fall considerably behind the bumper crop of last year, still the enhanced market value will more than offset any deficiency in the number of bushels produced. With large crops of all kinds and high prices for everything produced by the agriculturist, an assurance is certain of the continuance of flourishing business conditions for several months to come.

As far as fluctuations in prices are concerned, the Hardware market is comparatively featureless, and as most lines appear to occupy a fairly firm position, it is expected that values in a general way will remain about where they are for the remainder of the year.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—Market conditions continue about as at last writing. Orders are being placed with moderate liberality, and country buyers, while cautious, are not overcautious because the experience of the last two years has taught them the expensiveness of having a short supply on hand. The country at large is taking a vast quantity of goods, and this is particularly so in the way of edge tools and the better articles of manufacture, indicating that the men are at work and that their tool chests need replenishing. The jobbers' stocks, we take it, are being somewhat reduced from the very full proportions which they have enjoyed the past few years down to something more nearer to actual requirements for a short time ahead. This, as far as we can learn, seems to suit manufacturers passing well, as they will be able to get their order books in better shape, their machinery repaired and reset, which has been pushed overtime for a couple of years.

The railroads are still trying to make believe that they are going to get along on about half rations in the way of equipment, but their passenger trains are running fuller than ever and their freight trains are longer, and accidents, the ordinary processes of wear and destruction are as great as ever, so unless some way shall be devised by which one car shall do the work of two by more rapid transit and closer time limits at the terminals, we hardly see how these great consumers are

going to stay out of the market long at a time. General repairs and improvements are a very considerable item of expense, and the immense buildings which have been erected in the cities during the past few years all have to be looked after and kept up. In short, the country is growing larger in every way, and we could not possibly go back to the scale of production and expenditure that we had 10 or 15 years ago. The automobiles have contributed no little to the industry of the country by reason of their manufacture, and in every magazine by their advertisements they have taken the place occupied by bicycles when they were in their heyday.

Moreover not alone have the autos contributed to industry in the way of their manufacture, but they are giving the lawyers something to do in the way of bringing and defending damage suits. One appears in our local papers to-day, and describes the honking of the horn as being particularly offensive and threatening, so that the high strung horse which was "bred in Old Kentucky," felt the affront so keenly that he was constrained to turn the buggy over and inflict sundry damage upon its occupants. The ethics of auto management have yet to be evolved, whether simply the honking of the horn excuses the driver from the damages done, or whether failure to honk it would appeal to a jury as cause for a round penalty, we shall not know until these cases are tried. It will be something of a comfort if the speed is regulated, and the pedestrians and drivers have something of a chance for their lives.

Cleveland.

THE W. BINGHAM COMPANY.—Trade and traffic in the general Hardware line, mining, milling and manufacturing supplies are in a flourishing condition. The reports we get of good crops being harvested in the West is very encouraging, and we see no reason why we should not have continued good trade right through the balance of the year.

The outlook in the Steel market is very good. We understand in all lines of finished material specifications are fully up to the present volume of the mills, and somewhat in advance. A lot of construction work in factories, warehouses and bridges is going on, and it will require a large tonnage of structural material. It is reported that there is considerable inquiry for Pig Iron, indicating that the manufacturers are working it freely now and anticipate a steady run of their factories for some time to come.

It is said that the farmers in the West have paid off a large portion of their indebtedness and are putting more money into their homes, barns and storehouses, and in some instances are sending money to Wall Street to invest in low priced stocks, and many are indulging in the luxury of an automobile.

Prices for the most part in general Hardware lines are steady and firm. Merchants are buying well assorted orders, especially so in Mechanics' Tools, which indicates that the artisans are busy. There is a good business just now in Roofing Plates, Elbows, Stoveboards, Coal Hods and Fire Shovels. The recent cold snap we have experienced in this section has induced the merchants to put in quite a lot of "hurry up" orders for fall goods.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—In a general way we report business good, and from the writer's standpoint—after having completed a trip of more than 13,000 miles, covering the entire country from Maine to California, north of the Mason and Dixon line—there is nothing in sight to indicate that present conditions will not continue and improve, provided there can be an increase in the circulating medium which can be applied to commercial purposes.

In every part of this great country, and especially in the West and Northwest, there is more business offered than can be handled under present financial conditions. On every hand one hears the expression that if money were easier this and that property would be developed; that the railroads would make such and such improvements; that certain mines would be developed, and on

every hand opportunity is waiting for the further investment of capital. No reference is made to the fact that it costs more to build now than it did a few years ago, nor that land is more valuable.

The impression prevails everywhere that the demand for all kinds of merchandise will continue, and that labor will be fully employed, notwithstanding the stringent conditions of the money market, and that while there is undoubtedly a more conservative feeling and more hesitation about speculative buying, it is not caused by the apprehension of coming disaster, nor influenced by any apparent slacking up of the demand for manufactured product.

We cannot help but feel that the chief reason for the high price of money is that so many more people want it and have use for it in legitimate enterprises, not because it is necessarily scarcer, but because there is greater use for it, as a result of the prosperity that has attended all branches of industry. The whole country is growing tremendously, and, like an overgrown boy, needs an enlarged suit to keep pace with its physical development.

Portland, Oregon.

FAILING, HAINES & McCALMAN.—Fall business in this territory is setting in in earnest with a rush, and all the jobbers are hard put to satisfy their customers. Last year at this time we thought we were doing a phenomenal business, and so we were. This year in all lines business is even better. The financial uneasiness, which has been affecting the East and Middle West, according to newspaper reports, is no more than hearsay to the bulk of the business men in this territory.

There is every indication of a continuance of this prosperity, at least until well into the year 1908, as far as this territory is concerned. This is assured us by the good crops, the fair prices (in some cases phenomenal prices), and so far we have no reason to expect that it will not continue into next year.

Collections continue to be good, having become somewhat easier with the end of harvest.

St. Louis.

NORVELL-SHAPELIGH HARDWARE COMPANY.—We have arrived at the end of September without frost. Here in the West we have enjoyed ideal weather throughout the month.

The Government report indicates upon the average the corn and cotton crops are about five points below last year, and these crops of 1907 will be the same as the 10-year average. The Government report, however, does not have anything to say about the price the crops bring. Taking the present high prices of corn and cotton into consideration, we believe more actual cash will be paid for corn and cotton this year than ever before in the history of this country.

Large sums of money are going South to move the cotton crop, and soon the tide of money will turn backward toward the financial centers.

It seems to be the general feeling in the West that the danger of money troubles is now past. The banks are breathing more easily and realize that while heavy reserves in the way of cash look very well on a bank statement, having great sums of money lying idle in their vaults is very unprofitable. It is the old proverb of the buried talent. If we take a chance we of course run some risk, but if we seek safety by burying our talents we will have no profit for the Master when he comes.

Next week will be one of thrills. Tuesday night will be the thirtieth annual visit of his Majesty, the Veiled Prophet, to his beloved city of St. Louis. There will be a night parade and the usual ball. These doings attract many visitors to our city.

In addition to this, next Wednesday morning the President of the United States will come down the river and be our guest for a day. There will be a review on the river. Many Mississippi River steamboats will take part in the river parade. The President may have seen imposing arrays of battleships at Jamestown and in other places, but we are inclined to believe even his iron nerves will be shattered when the old time river pilots line up

their steamers to do him honor on the swift current of the Mississippi.

We sincerely trust there will be no accidents, as, while it might be picturesque, it would nevertheless be a cause for serious regret if the President of the United States landed at the foot of one of our streets, with a life preserver around his portly frame, like Neptune rising from the sea. We have been invited to take a place on one of these steamers, but as the roof of our building overlooks the scene of action we have decided that caution is the better part of valor. We will, therefore, take our position where nothing but an earthquake could shake us.

From here the President will go down the river by steamer, and discuss a plan of a 14-ft. waterway from St. Louis to the Gulf. How times change! Thirty years ago our levees were lined with palatial steamers, six deep. With the advent of the railroads all this old time river life has passed away. Are we to see fortune again turn her wheel and the picturesque traffic of the old days restored to the Father of Waters?

NOTES ON PRICES

Wire Nails.—The market is in a good condition, with demand large and improved deliveries. The supply of steel and cars is about sufficient, and prices are firmly maintained. The output of the leading mills is said to be sold for some time to come. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers..... \$2.05
Carload lots, to retail merchants..... 2.10

New York.—Demand is fair, but not particularly active. Local jobbers and Nail houses are holding small lots at store at \$2.35, base, and in general this price is fairly well maintained.

Chicago.—With requirements largely covered by contracts already placed, the amount of new business coming in is relatively small, though by no means inconsiderable. Deliveries are improved, and prices are generally fairly well maintained. Quotations are as follows: \$2.23 in car lots to jobbers, and \$2.28 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—In the last week or two demand for Wire Nails has increased very materially, and any concessions in prices formerly made by one or two outside mills has entirely disappeared, and the market is referred to as being very strong, with regular prices being firmly held. All the leading Wire Nail mills are filled up with orders, and have their product sold up for some time ahead. A good many of these contracts were placed prior to the advance in prices, and buyers are specifying very freely, shipments by the mills being heavy. The supply of cars and of steel is very satisfactory, and present general conditions in the Wire Nail trade could hardly be better. The market is very firm and we are advised all the mills are adhering rigidly to fixed prices. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers..... \$2.05
Carload lots, to retail merchants..... 2.10

Cut Nails.—Demand is confined, to some extent, to small lots for prompt shipment. Quotations are as follows, f.o.b. Pittsburgh, Steel Nails, carloads, \$2.10 base. Iron Cut Nails usually command 10 cents advance over these prices. The market is referred to as only fairly strong at these quotations.

New York.—Demand is comparatively light from the immediate territory. Quotations for small lots at store are \$2.35 base, but concessions are sometimes made from this price.

Chicago.—It is stated that at the recent meeting of the Cut Nail Association, prices were reaffirmed. This is taken to mean that the conditional 5 cent advance provided for in event of the advance in Wire Nails, will not become operative. Local jobbers are accordingly adher-

ing to the prices herewith quoted, which are well maintained. Quotations are as follows: Iron Cut Nails, carloads, to jobbers, \$2.38; to retailers, \$2.43; Steel, to jobbers, in carloads, \$2.28; to retailers, \$2.33.

Pittsburgh.—Buyers are not showing a disposition to contract ahead for Cut Nails, and as a result demand is rather light and is mostly for small lots for early shipment. There is more or less unevenness in prices, the market on Steel Cut Nails being represented by the quotation of \$2.10 in carloads, and \$2.15 to \$2.20 in less than carloads, f.o.b. Pittsburgh. The market is only fairly strong at these prices, which are sometimes slightly shaded. Iron Cut Nails usually bring about 10c advance over these prices.

Barb Wire.—Specifications on contract orders are being freely received by mills, and shipments are heavy. New business is relatively light. The advanced prices recently announced are being more generally maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Chicago.—Even with the heavy shipments being made on specification against contracts there is some complaint of slow deliveries. New business is comparatively light. We quote as follows: Jobbers, Chicago, car lots, Painted, \$2.38; Galvanized, \$2.68; to retailers, car lots, Painted, \$2.43; Galvanized, \$2.73; retailers, less than car lots, Painted, \$2.55; Galvanized, \$2.85; Staples, Bright, in car lots, \$2.35; Galvanized, \$2.65; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—A fair amount of new business is being placed, but the mills are busy on old contracts on which buyers are specifying freely, and shipments are heavy. It is claimed that any unevenness in prices that recently existed has entirely disappeared, and that all the mills are now adhering rigidly to official prices. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Smooth Fence Wire.—A large volume of business is being entered by the mills, including that from Fence manufacturers and other consumers. Specifications against contracts placed some time ago are being received by the mills, customers insisting upon prompt shipments. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. for cash in 10 days:

Jobbers, carloads.....	\$1.90
Retailers, carloads.....	1.95

Chicago.—Fence makers requirements are exceptionally heavy and shipments are being urged. In addition to a large volume of specifications much new business is still being offered and prices are firm. Quotations are as follows: In car lots, to jobbers, \$2.08 f.o.b. Chicago, and to retailers, \$2.15.

Pittsburgh.—Fence manufacturers and other consumers are buying heavily, and the mills are entering a large volume of business. Specifications against contracts placed some time ago are coming in freely, and shipments by the mills are heavy. Consumers still insist on prompt shipments, showing that stocks of Wire all over the country are very light. The tone of the market is firm, and we are advised that official prices are being held. Quotations for base numbers 6 to 9 are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.90
Retailers, carloads.....	1.95

Window Glass.—The scale of wages submitted to the manufacturers by the Amalgamated Window Glass Workers of America is to be reconsidered by the association, as manufacturers of Window Glass are not willing to start their factories at the proposed advance in wages. It would probably take nearly a month to for-

mulate a new scale of wages, and work at the factories cannot be resumed for about three weeks after fires are lighted. Manufacturers and workmen are both anxious to resume work. It is said that some manufacturers are disposing of Glass at less than regular quotations to enable them to meet financial obligations, while the workmen have about used up the money they made last fire. It is possible that a wage scale may be arranged, which will bring about a compromise with the manufacturers to induce them to resume operations. It is estimated that there is now about 300 pots, making hand blown Glass, in blast, but these factories are supposed to be operated on the co-operated plan, where the workmen get "market money," and share equally in the net profits at the end of the season, if there are any. Quietness characterizes the local demand, and prices are reported as ranging, according to the anxiety of sellers, from 90 and 10 to 90 and 15 per cent. discount on single, and from 90 and 10 to 90 and 20 per cent. discount on double strength Glass from the jobbers' list, October 1, 1903. Western jobbers' discounts are reported as being 90 and 10 per cent. discount for the first three brackets of single thick; 90 and 15 per cent. for other brackets of single thick, and 90 and 20 per cent. discount for all sizes of double thick, from the same list.

Coil Chain.—The market for Proof Coil Chain has steadied considerably and prices are now said to be fairly uniform on a basis which may be represented by a quotation on 3 in. of 4.40 in less than cask lots, f.o.b. Pittsburgh.

Tacks.—While business is in moderate volume, quotations on American Carpet and Cut Tacks, &c., show remarkable steadiness. Considerable reductions in Copper Tacks and Brass Shoe Nails have recently been made as a result of declining raw materials.

Jack and Safety Chain.—Some shading of prices is reported on the part of manufacturers of Jack and Safety Chain. Concessions of from 5 to 10 per cent. are being made to the largest buyers.

Axes.—Axes are in good demand and the market is decidedly firm. There is considerable complaint regarding slow deliveries on several leading lines.

Wire Cloth.—It is understood that the new Chicago selling company, which will market the product of several of the smaller manufacturers of Screen Wire Cloth, is negotiating for all or a portion of the output of other mills, with fair prospects of making satisfactory terms. The total production controlled by the company will, it is said, approximate 150,000,000 ft. There is reason to believe that this and other important interests in this line will act in harmony, and that next season's market will be characterized by regularity. Announcement of the price will probably be delayed until nearly the end of the year. This was the policy pursued last season, with satisfactory results, especially to the jobbing trade.

Padlocks.—A conference of manufacturers of Padlocks is being held this week in this city. As has previously been intimated in these columns, quotations on Padlocks are exceedingly firm, in spite of the weakness of Brass and Copper, and there are indications of some important developments beneath the surface likely to affect the market for these goods.

Pocket Cutlery.—The demand for Pocket Cutlery is excellent, and, indeed, is said to be in excess of the supply. Business on both domestic and imported brands of recognized merit is taxing the capacity of the manufacturers, few, if any, of whom are able to make early deliveries on new orders. Under these conditions prices are naturally firm.

Table Cutlery, Etc.—Fall business is said to be a little sluggish on fancy Table Cutlery, Carving Sets, Silver Plated Flat Ware, &c. Buyers are disposed to delay ordering, and are showing conservatism in estimating their requirements, taking a chance that they can secure fairly prompt deliveries, if they need additional goods for the holiday trade. Opinions differ as to how this season's holiday demand will compare with that of a year ago.

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Hatchets.—A conference of manufacturers of Hatchets, held last week, resulted in a reaffirmation of ruling prices. The market appears to be entirely regular, being represented by a discount of 40 and 2½ per cent., with an extra 5 per cent. on fair sized orders.

Shears and Snips.—At a meeting of manufacturers of Shears, Tinnery Snips, &c., held recently, the market was reported to be in excellent condition. The new list prices adopted in the summer are now in general use and are said to be well received by the trade.

Cast Iron Soil Pipe.—Considerable irregularity is observed in the market for Cast Iron Soil Pipe, which is to all appearances an open one. Activity is confined almost entirely to sellers, some of whom show a desire to get business at almost any price. This in the case of a few small manufacturers is attributed to the urgency of their financial requirements. Doubtless the tendency to lower prices for Iron is an appreciable factor in the situation, and it must also be admitted that there is an ever present tendency to overproduction. Buyers are naturally inclined to be wary and it is said that no concessions will tempt them to purchase in any considerable quantities, as they are afraid of a further shrinkage in prices. Leading producing interests, however, assert emphatically that there is no cause for alarm, as most weak spots have now been uncovered and the situation is already on the mend.

Squares.—Competition among manufacturers of Steel Squares is becoming a little more aggressive, and as a result some concessions in prices are reported. As yet, however, these are only observed in quotations to the largest buyers.

Cast Iron Hardware.—Prices on Cast Iron Hardware do not seem to be quite as firm as they were, particularly on such goods as Gate and Blind Hinges, &c. The irregularity on these lines has been occasioned, it is said, by new manufacturers of limited output, who have recently entered the market.

Copper Products.—A further reduction in the price of Copper and Brass materials was effected September 30, of which the following prices per pound are some examples, viz.: Copper Sheets, 20 cents base, in conformity with earlier individual reductions noted in our last report; Brass Sheets, 16½ cents base; Seamless Copper Tubes, 23 cents base; Seamless Brass Tubes, 20 cents base; Brass Wire, 17½ cents base; Brass Rods in the rough for drawing, 16½ cents base; Copper Bottoms, Pits and Flats, 24 cents base; Round Copper Bolt, in large quantities, 17½ cents base, and 1 cent per pound advance for Square Copper Bolt; Tobin Bronze, 18 cents base, a reduction of 2 cents per pound. Bare Copper Wire, in carload lots at mills, is unchanged at 16½ cents base; Soldering Coppers, 25 cents base, with the likelihood of a lower price in the near future, and Copper Rivets and Burrs 50 per cent. discount from list, a price which can be shaded for round lots. Some of the trade who for several months have reported exceptional dullness in these lines now notice a better feeling and a somewhat stiffer market, which is explained by the placing of orders which have been withheld in anticipation of the prices now current. No especial vigor in buying, however, is anticipated for the rest of the year.

Ice Cream Freezers.—As we approach the time when prices are usually announced and contracts entered by manufacturers of Ice Cream Freezers there are indications that next season's market will be an open one. Thus early it is impossible to tell to what extent if any irregularity in prices will develop. Some well-posted persons refer to last year's prices as low and state that manufacturers even under stress of competition can hardly afford to make appreciable reductions, especially in the face of the increased cost of labor and the scarcity and high price of lumber suitable for tubs.

Linseed Oil.—Transactions are confined to small lots, and large buyers whose contracts have expired are buying only for immediate requirements. New seed has advanced in price and is coming into market very slowly. But a small proportion of the crushers are operating their plants, and their stocks of Oil are being gradually reduced. It is doubtful whether a sufficient quantity of

Seed will be shipped before water transportation closes, to supply requirements until it opens again in the spring. It is possible that further advances in the price of Oil may take place under these conditions. New York quotations for five barrel lots are as follows: City Raw, 45 cents per gallon; Western Raw, 44 cents per gallon; Boiled Oil, 1 cent a gallon over Raw.

Spirits Turpentine.—An improved demand in Savannah has strengthened the local market, which has advanced 1 cent per gallon during the week. The demand here has been light. New York quotations are as follows, according to quantity: Oil Barrels, 54½ to 55 cents; Machine Made Barrels, 55 to 55½ cents.

Rope.—The large trade is not as willing to place contract orders for the coming year as it was in the Fall of 1906, owing to the declining tendency of Hemp, and is consequently buying in smaller lots. Manufacturers are endeavoring to maintain prices as most of them are supplied with fairly high priced Hemp, but under the conditions of a restricted demand and lower priced raw material, the market is not exceptionally strong. The card price, however, remains unchanged as follows: Pure Manila 12½ to 12¾ cents; B. quality, 11½ to 11¾ cents; Pure Sisal, 9 cents; lower grades Sisal, 7¾ to 8 cents; No. 1 Jute, ¼ in. and up, 9 cents; No. 2 Jute, 8 cents.

NEW YORK ELECTRICAL SHOW.

An exhibition of electrical appliances, apparatus and devices is now being held in the Madison Square Garden, New York, having opened on the evening of September 30, to continue until the evening of October 9. The great adaptability of electricity, not only for power and purely mechanical industries, but to the continually enlarging field for domestic use, such as lighting, cooking and cleaning and heating of buildings, enhances greatly the interest of such a demonstration to the general public.

Among the exhibitors are the New York Edison, Brooklyn Edison, General Electric, Marconi Wireless, Westinghouse, Western Union Telegraph, Postal Telegraph, Monatan Construction, National Lamp, Telharmonic Music, Standard Roller Bearing and Telelectric Music companies. Others include G. M. Gest, New York Beck Lamp, Mogul Paint, Driver-Harris Wire, Safety Car Heating & Lighting, India Rubber & Gutta Percha, Federal Sign, National Dairy Supply, Thomas Prosser, F. Alexander, Standard Wire Brush and other interests, including the Electrical Testing Laboratories.

There is much to interest the machinery trade in the way of motor driven machine tool and other electrically operated mechanical equipment. The Garvin Machine Tool Company, New York, is exhibiting a line of motor driven lathes; Chicago Pneumatic Tool Company, Chicago, electric drills; Driver Harris Wire Company, Harrison, N. J., advance metal wires; General Electric Company, Schenectady, N. Y., air drills, emery wheels, &c.; Kenney Electric Mfg. Company, New York, electrically operated machinery; Fried, Krupp & Thomas Prosser & Son, New York, cast steel and machinery; Standard Roller Bearing Company, Philadelphia, Pa., roller bearings; American Wire Brush Company, New York, casting cleaning brushes; W. Green Electric Company, New York, machine tool motors; Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., electric equipment; Westinghouse Machine Company, engines, turbines and stokers.

Of much popular interest are the various displays relating to the adaptation of electricity for domestic utilities. The entire Fourth avenue end of the Garden has been fitted up with furniture, rugs, draperies, &c., and subdivided to resemble a suite of apartments, including kitchen, dining room, library, drawing room and bedrooms, in which electricity cooks the food, washes and irons the clothes, plays the piano, and lights and heats the rooms. In another display there is an electrically operated refrigerator, by means of which enough ice is formed each day to supply it. Sewing machines for domestic use are operated by electric motor, and as readily controlled in every way as by ordinary foot power.

SAMPLING DOOR AND WINDOW SCREENS.

THE accompanying illustrations represent home made and inexpensive methods of sampling Screen Doors and Adjustable Window Screens, in use in the Hardware store of Heinsohn Brothers, Mount Vernon, N. Y. The arrangement shown in Fig. 1 is placed between the end

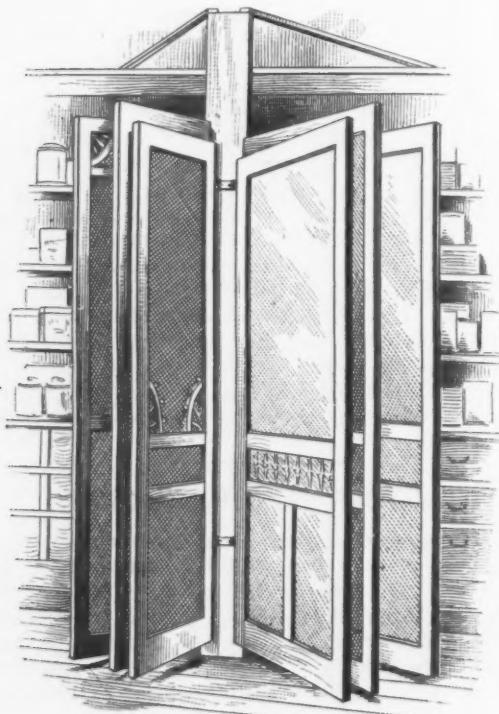


Fig. 1.—*Sample Screen Doors.*

of a counter and one of the show windows, and consists of a board $\frac{3}{8}$ x 9 in., long enough to accommodate 7-ft. doors. Angle irons secure it to the floor, and at the top wooden braces extend from the board to the shelving cornice. On the front of the board are fastened two hardwood strips, each 18 in. long, 1 in. thick and $1\frac{1}{4}$ in. wide. The lower strip is 20 in. from the floor and the upper one is 52 in. above the lower one. Square shouldered wire hooks are screwed in each of the wooden strips at equal distances apart, those in the lower strip being directly under those in the upper strip. Screw eyes are put in the back edges of the doors, the same distance apart as the

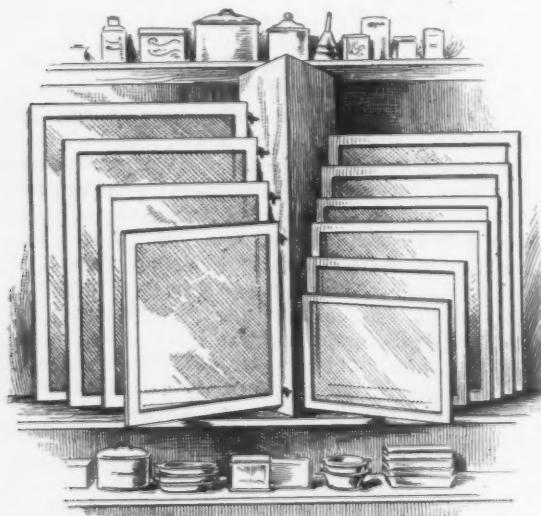


Fig. 2.—*Sample Adjustable Window Screens.*

hooks on the strips, so that the eyes in the doors can swing on the hooks in the same manner as if the doors were hung on hinges. The sizes are marked on the front

edge of the doors in pencil, and on a card, on each door, are marked the various sizes and prices in stock. The rack accommodates nine doors and a sample of each style of door is displayed. The use of hardwood for the strips is to prevent the screw hooks pulling out. The arrangement permits showing all styles of Doors at once, swinging them to display both sides, and allowing a comparison of styles and prices by the customer. The last Door of any style sold will, of course, be the sample which can be unhooked from the rack and delivered. The greatest advantage, however, is that the Doors, out of the way, are easy to show and are in the same position as when hung at the purchaser's home. The rack can be removed at the end of the season in a few minutes and replaced again the following spring in the same place or in some more desirable location.

The arrangement for sampling Adjustable Window Screens, illustrated in Fig. 2, is built on the same principle as for the doors. Customers often ask for a Screen "to fit an ordinary sized window," and this plan of sampling them was primarily adopted for the purpose of showing that there are no windows of ordinary size. The hardwood boards upon which the screens are hung are 10 in. wide and 37 in. high, placed at an angle to each other, so that the back edges are 10 in. apart. The lower ends of the boards rest on the shelving, and at the top are under a projecting shelf, held in place at top and bottom by angle irons. The Screens are hung $1\frac{1}{2}$ in. apart, at the back, each by two screw hooks and eyes, allowing 16 Screens to be displayed, eight on each side. This takes in sizes ranging from 12 x 20 x 33 to 30 x 28 x 45 in. The size and price of each Screen is marked on a card tacked to the Screen. The arrangement permits extending a Screen, with one hand, to satisfy customers that the screen will fill their requirements, besides having the Screens kept in an orderly manner, instead of standing against each other on the floor or being piled up on a counter.

DOES RETAIL ASSOCIATION MEMBERSHIP PAY?

BY HOOP IRON.

A recent convention six or eight of us were seated in the lobby of our hotel talking over things in general, and the subject of Lawn Mowers came up. It seemed a little odd that all of us handled the same cheap Mower. Each one (with the exception of myself) told what he was paying for the Mower, and I felt a little foolish to find that I was paying 20 cents each more than the highest and 30 cents each more than the lowest figure paid, and I was buying direct from the manufacturer in lots of 40 to 50 Mowers. Until that time I certainly considered that I was on the ground floor.

That little talk saved me \$15 on my next order for Lawn Mowers. This incident illustrates the point exactly why it pays to get together. The merchant who does not believe in associations and blindly compares prices offered him by different salesmen and deludes himself into the belief that he has touched bottom, needs only to rub against a few of his hustling associates in business to bring the size of his hat back to par.

It is in the natural order of things that the merchant who is a member of the association and attends the conventions gets the inside prices, because he is a better posted man, and being posted counts when goods are being purchased.

One of the best investments I ever made was in paying \$5 a year for the privilege of getting a bunch of dealers in a corner and asking them questions.

RICHARD C. SMITH, formerly of the American Steel & Wire Company and the National Wire Corporation, has recently been appointed sales agent of the Safety Insulated Wire & Cable Company, 114 Liberty street, New York, superseding Avery P. Eckert, resigned. Mr. Smith has chosen as assistant R. C. Wilson.

CUSTOMERS FIRST.

BY FAR WEST.

IT is the policy of some stores to resort to every expedient to influence customers to make a purchase. To some it may be flattering to be handed over by one clerk to another, or perhaps to the head of a department, if a sale is not effected through the efforts of the

first salesman. To the majority of

Offensive Persistence. people such persistency becomes offensive, smacking too much of the nature of a hold-up. One sale may be made, but

a regular customer is apt to be lost. It is good business to do everything possible to put possible customers at their ease. Sales of Refrigerators, Lawn Mowers, Stoves and many articles requiring the outlay of a few dollars are not always made the first time shown, and, while a salesman will do all in his power to politely influence a customer to decide before leaving the store, yet full liberty should be given the customer and

Courtesy in Salesmanship. no undue pressure brought to bear upon him. There is hardly anything more gratifying than to have people, after going the rounds shopping, come back to your place and leave their order. If they do not return, the Hardwareman has many ways of finding out why they did not, and will follow his leads until he knows what it was that lost him the sale. Without investigating he is apt to rashly accuse his competitors of price cutting.

Limit Variety.

Customers are sometimes confused in their decision as to what to buy when they are confronted with a large variety of articles. One Hardwareman has solved this problem for his customers by relying on his own judgment in buying and limiting the variety of prices, aiming to present his customers with articles which his experience has shown to possess advantages and talking points above anything on the market, then backing up his judgment with a money back guarantee.

The Duties of a Clerk

in a Hardware store are so varied that as they come one after another he is inclined to think that if he unpacks, marks and disposes of the goods in their proper places quickly and the work is well done he has fulfilled his duty to his employer in that particular. That clerk will be of more value to his employer, if in addition to wishing to please him, he will adopt the caption at the beginning of this article and let the guiding star of his conduct be "Customers First." A New York **Selling Counts.** publisher once said, "It is not the writing of a book, it is not the printing of a book, but the *selling* of a book that counts." All the duties of the clerk will have a new meaning and take on new life if the thought of selling is made the main issue.

A Few Definitions.

To get a clear idea of the clerk and his duties, a few definitions may help. It is only in the United States, according to Webster, that clerk means an assistant in a shop or store. On the Continent and in **English Usage.** England the word clerk conveys the idea of a scholar or one connected with the clergy.

Webster's definition of salesman is one who sells anything, one whose occupation is to sell goods or merchandise. The correspondence schools say the real salesman has the ability to arouse interest, create desire, promote business and make profitable sales. With these definitions in mind the beginner in a Hard-

American Meaning. ware store may properly be called a clerk with the American meaning of assistant.

Under proper training he will grow in knowledge and look forward to the time when he will be allowed to wait upon trade, learning that the whole nucleus of the business centers in the customers. In too many stores we meet assistants whose supposed

The Wrong Kind. occupation is to sell, or at least show, goods or merchandise, but who will upon the entrance of a customer finish a tale to a fellow assistant, while the customer

waits, or, should he start to leave, will call after him: "Was there something you wanted?" Or the one who carries on an argument with another assistant and at the same time goes through the motion of showing goods, giving the customer just as little attention as possible.

One Fault of the American Clerk

is his lack of courtesy. His brusque, indifferent manner may stand in his eyes for independence, but it is very bad business. All these faults will be corrected if "Customers First" becomes the motto. If it is part of your duty to wait upon trade, drop everything the moment a customer enters the door, even if there are other clerks around. The barber shops give this hint in the way each man stands ready behind his chair when a patron enters.

Cultivate a Pleasant Mood.

The mood in which you approach a customer counts for much. Look pleasant. Simulate a smile. A patron in a confidential mood was heard to say that he did not like to deal at a certain store, because the clerks acted as though they were conducting a funeral with himself the chief mourner. A salesman does not say to a prospective customer: "Is there something you want?" It is taken for granted he came for something. Usually a pleasant salutation on the part of the clerk is sufficient, as the person coming into the store has something on his mind and only wants the opportunity to unburden.

Value of Catalogue Knowledge.

Study catalogues diligently in your spare moments, study the Rope and Wire Tables and Nail cards. Examine new goods as they come in; take them apart; know them. As a test of your catalogue knowledge, see if you can tell offhand what an "extra" Plastering Trowel is, what firm makes it and how it differs from the regular. You will not then send a customer to a

jewelry store for Hair wire. Do not depend on others.

Two clerks were at the front of the store when an inquiry was made for Green Screen Paint. "We have Black, but no Green," said one. A third clerk, going to the shelf, found a can of Green, caught the customer as he was going up the street, and a \$2 sale was made. The clerk who had not looked for himself said in excuse, that he had asked the other clerk, and had been told there was none.

Importance of Proper Assembling.

Many articles are shipped into the store that have to be put together. If it is your duty to assemble them, and if you are following the "Customer's First" plan, the Lawn Mower that leaves your hand will be properly adjusted for the customer's use. Boy's Wagons will have bolt ends riveted, preventing annoyance to the customer from the nuts being continually lost.

Attention to Details.

The store will be kept clean and attractive. The clerks will see things to do and keep the Bolt and Screw cases and Nail bins filled. The show windows will, indeed, be the eyes of the store. That proprietor will prosper, and promotion and profit will come to the clerk, assistant and salesman whose motto is: *Customers First.*

CHARLES B. PAUL, 467 Keap St., Brooklyn, N. Y., well known to the trade as a manufacturer for many years of Hand Cut Files, has retired from business, and his tools, stock and good will have been disposed of to Murcott & Campbell, 296-300 Union Avenue, Brooklyn. The latter firm has also had a long experience in the making of Hand Cut Files, having been established in 1868. Last year the growth of the business necessitated an increase in plant and equipment, and the firm is now in excellent position to handle promptly all orders from the trade.

R. E. COUNCE has purchased the Hardware, Stove, Implement, Paint and Harness business of J. O. Butler, Red Cloud, Neb., and will move the same to Hayes Center, Neb.

AT THE POINT OF THE PEN.

Some Thoughts Suggesting Themselves to the Rambler.

BY CLARFIELD.

If you meet a man with a dirty collar and shirt front, you are not much inclined to travel along with him; no, he isn't very attractive, nor overcharged with magnetism. Now, how about the store with the careless window display or dirty entrance? Have you ever heard the man inside complaining about hard times?

"Yes," said a bystander, recently, "advertising works miracles!" Wrong again! Advertising gets logical results; nothing more nor less. The only miracle that it works is the changing of money into space, and even that is the logical result of wrong advertising. Mix liberal business gumption and horse sense into this as you do into other transactions bearing upon your success or failure.

Ever notice that the straight front view of a very handsome building makes a pretty tame looking picture? No perspective; that's the reason. Most photographers will climb a telegraph pole to get a corner view, or to work in a little of the beauty of the surrounding landscape. How about your business; sticking so close to it that you see only the flat front; one side? Resolve to get a little perspective on it this year. Go fishing—go most anywhere. When you come back you'll wonder how it is that you have permitted some things to exist so long.

"Most men are fools," may be more politely stated as the old Quaker put it, "Yes, Martha, every one has his peculiarities, excepting thee and me, and even thou hast a few." Don't put too much faith in that "fool" statement, lest you yourself should fall rightful heir to the title. Your competitors must have something besides rattle balls in their think boxes or they wouldn't remain in business. Better to keep a kindly eye out in their direction than to wake up too late.

"He's a book merchant—couldn't do business without his trade papers." You didn't land a fair blow when you said that. It's good to be practical, but it's a big item to the other fellow's credit if what you have said is so.

"We don't try to meet city conditions out here; don't have to; we're too far away." Then for Heaven's sake stop pestering your representative in Congress with requests to fight parcels post. If you were to do your part at home, there might not be such an urgent need for making a fight.

It may be nice to have your neighbors drop in and discuss every topic from the local preacher to the latest saloon scandal, but if it pays so well, why not put in a few tufted chairs and some other things conducive to conviviality, and cut out the Hardware?

Look for ideas in your help. The beginner at \$4 a week with ideas that can be developed means more to the future of your business than the 10 year man at \$15 per, who is doing things over each day just because someone has taught him to do them that way.

Ever think of the tussie and troubles you had in getting as far as you are now in life and in business? Employers too often forget those

things in dealing with the fellows who are in some earlier stage of the game.

Pay to compete? Well, rather! not price wars; not mud slinging; just careful, well planned competition.

Don't be a lemon merchant. Lemons are good for biliousness, but treat your own case; not others.

If your clerks know when to talk, they should also know when *not* to talk. Customers are constituted on different lines. Too much talk often does more to injure trade than too little.

WAYS AND SCHEMES TO ATTRACT TRADE

THE SPATULA PUBLISHING COMPANY, Boston, Mass., has lately issued a book entitled "1000 Ways and Schemes to Attract Trade," by Irving P. Fox, editor of the *Spatula*. The book contains 210 pages and the ideas and methods concisely set forth are not theoretical, but are said to have been used to advantage by successful merchants during the past five years and to have resulted in attracting people and selling goods. A number of the ideas have relation to the Hardware line, but many others may be adapted to it. The price of the book is \$1, postpaid, and the publisher offers to return the money if the purchaser is not satisfied.

AMONG THE HARDWARE TRADE.

The Warren-French Company, capitalized at \$10,000, has been organized in Wellington, Ohio, by W. D. Warren, R. L. French and others. The company will handle a general line of Hardware.

Thompson Hardware Company, Canyon, Texas, has been incorporated with a capital of \$25,000 by W. A. Johnson, H. J. Gill and T. G. Thompson to conduct a wholesale and retail business in Shelf and Heavy Hardware, Stoves, Implements, Paints, Sporting Goods, &c.

The Briggs Hardware Company, Delta, Ohio, has been incorporated with a capital of \$10,000 by M. W. Briggs and others.

The large establishment of the T. Frank Ireland Company, Belding, Mich., was visited by fire on the 7th ult. The entire stock was badly damaged by fire and water, and the building was partly destroyed.

A fire recently occurred in the Hardware store of D. A. Lasher, Wymore, Neb. The damage to stock and building was less than \$1000.

J. J. Willenborg, Buffalo, Ill., has purchased the interest of his partner in the firm of Willenborg & Herschfield and will continue the business under his own name.

Neal & Bagwell, Overton, Texas, have put in a new stock of Hardware and allied lines.

White & Lafurgey, Hardware and Implement merchants, Mt. Morris, Mich., have dissolved partnership, being succeeded by Jacob Lafurgey.

In the interest of its Crimped Spring Fence the Spring Steel Fence & Wire Company, Anderson, Ind., has for years published the "Shimer Outlook," a four-page circular issued monthly. This paper is circulated among merchants to some extent, but the bulk of the edition goes to farmers and land owners. It has proved a very desirable medium through which to advertise the company's products.

The Trades 100 Years Ago.

Tenth Article.

The following article with the accompanying illustration is taken from the "Book of Trades, or Library of the Useful Arts," which was published in 1807 by Jacob Johnson, London, and at that time for sale in his bookstores in Philadelphia and Richmond, Va.

The Brazier.

This artificer makes kettles, pails, candlesticks and other kitchen utensils in brass. In the shops we often find that the same people deal in brass, copper and tinware, and not unfrequently the furnishing ironmonger sells almost every article made in brass and copper, particularly in large country towns. In such cases the brazier neither makes nor is supposed to make all the different articles in his shop; it is sufficient for his own purpose, as well as for the advantage of his customers,



Brazier

that he should be so much of a working brazier as to be a competent judge of the workmanship of all the goods in which he deals. If he is a master in a large way he employs a great number of hands in the different branches of his trade, and his profits are of course in proportion to the magnitude of his capital.

Some of the articles manufactured by the working brazier are beat out with the hammer and united in their several parts by solder; others are cast. Those which are cast belong to the business of the founder, except the polishing and finishing, which require the art of the brazier.

The working brazier has need of strength, and if he would excel in his profession he should possess ingenuity to finish his work with taste.

The founder is employed in casting a thousand different articles in brass, for which purpose he has models of the work designed; to these he fits the mold in which he casts his metal. He rarely designs anything himself, and his chief skill lies in melting the brass and running it into the mold evenly.

There are various kinds of founders; some who cast for braziers only, others who cast the different smaller articles for coachmakers, saddlers, &c., and some cast the brass cannon to carry on the dreadful art of war.

The founder requires a strong constitution to undergo the heat of immense furnaces; he may earn 30 shillings per week, but it frequently happens that he spends a large portion of it in porter.

Brass is not a simple metal, but compounded of copper and zinc in certain proportions; if the proportion of copper is greater the compound is Pinchbeck. Copper alloyed with tin makes bronze, bell metal, &c.

Copper is dug out of the earth or is found united with many springs containing a portion of sulphuric acid. The richest copper mines in the known world are in the Isle of Anglesea. The mountain from which the ore is dug is called Parys, and from it have been dug 30,000 tons in a year. There are two springs at Herngrundt, in Upper Hungary, so richly impregnated with copper and vitriolic acid that iron thrown into them is dissolved by the acid, and the copper falls to the bottom in its metallic form. Near these springs pits are dug and filled with water; old iron is then thrown into them, which in about a fortnight or three weeks is taken out and the copper scraped off. By this process 100 pounds of iron will produce from 80 to 90 pounds of copper. The same method is adopted at some springs in the County of Wicklow, in Ireland, and here 20 pounds of iron will yield 16 of copper, which fetches a high price.

The coppersmith makes coppers, boilers and all manner of large vessels for brewers, distillers and others. His work is very laborious, and the business is the most noisy of all mechanical employments. The wages of the journeymen are equal to the powers of body required in the operations.

Copper is used in a variety of the arts, but vessels made of it for culinary purposes are highly prejudicial, for acid and fatty substances when left in them any time combine with the copper and form verdigrease, which is an absolute poison, and when taken in the smallest quantities it is very prejudicial.

To prevent these pernicious effects most copper vessels are well tinned on the insides. This operation is thus effected: The surface is well cleaned by rubbing it with sal-ammoniac or an acid, the tin or a composition of tin and lead is then melted in the vessel and rubbed well about it with old rags doubled up.

The plate which accompanies this article represents a brazier working at his anvil. He has need of a forge as well as the smith, and, like him, his shop must be furnished with a strong bench, vises, pincers, and files of various kinds.

THE STORM MFG. COMPANY, manufacturer of Dumbwaiters and Elevators, has removed its factory and main office to its new building, 40-50 Vesey street, Newark, N. J.

THE BRACKETT HARDWARE COMPANY, Petoskey, Mich., has been succeeded by the Northern Hardware Company. This is simply a change of style, A. B. Klise continuing to control the stock, which has been considerably increased.

Hardware Window Display

A HARDWARE FLOAT.

THE accompanying illustration may be suggestive to merchants who have occasion to get up floats for local parades. It represents a float dressed by Rudy & Gartner, Paola, Kan., for use in a Fourth of July parade

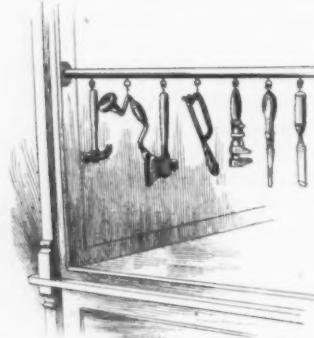


A Hardware Float.

in their town. The wagon contained nothing except a Round Oak Heater with a young man dressed in Indian costume to represent Doe-wah-jack. Signs displayed on the sides of the float called attention to the general lines carried by the firm.

TOOLS HUNG ON CURTAIN POLE.

THE accompanying cut illustrates a method employed by a New York City merchant to display hand tools in



the pole at regular intervals are screwed bright wire screw eyes—brass looks best—and the tools are either hung in these eyes by hooks in the handles or fastened to them by fine wire. The advantage of the contrivance is that it can be applied to numerous lines of goods and can be easily put up and taken down.

A LOCAL JOBBING HOUSE'S SALESMEN'S ADVANCE POSTALS.

THE GEO. KRAUSE HARDWARE COMPANY, Lebanon, Pa., which carries on quite a jobbing business in connection with its extensive retail trade, sends out every month salesmen's advance postal cards which have, we understand, made a hit with the recipients. The early cards in the series were all printed in one color, black, but during the past three or four months the cards have made their appearance in two colors, black and another. The magician in the cards reproduced herewith was in red, while the swordsman was in a dark yellow. It will be observed that the company emphasizes the advantage secured by its proximity

to customers, which diminishes freight charges and promotes prompt delivery of goods. While the illustrations which appear in the cards are not original with the company, the electrotypes being purchased from parties making a specialty of furnishing them, the arrangement followed, the wording on the cards and the ideas embodied are to be credited to the company, and the printing is executed by a local establishment.

The Krause people also get up pay envelopes for the



Salemen's Advance Postal.—Actual Size 3 1/4 by 5 1/4 In.

use of manufacturers in Lebanon and vicinity, in which attention is effectively called to the business, catchy illustrations being also employed in this connection. These



Salemen's Advance Postal.—Actual Size 5 1/2 by 3 1/4 In.

envelopes are also found of service in the store in accommodating small purchases of Screws, Hooks, &c.

As we have already noted in these columns, the company also makes good use of pictorial and other advertising electrotypes in its local newspaper announcements, special pains being taken to render the space as effective as possible in attracting custom to the store.

The Rogers & Baldwin Hardware Company, Springfield, Mo., has materially increased its capital stock to take care of the enlarging business done by the company. The company's business is mostly wholesale, but some retailing is also carried on.

N. J. Newth Hardware Company, Ilion, N. Y., has purchased the stock of Grimes & Pelton, a firm which has been in business in Ilion for over 20 years. W. J. Grimes will remain with the new company, of which L. E. Hollister will be manager. It is planned to erect a new brick block, which the concern will occupy next spring.

S. G. Ingle has sold his interest in the Samuel Gordon Ingle Company, San Diego, Cal., most of it having been purchased by Roscoe Hazard and E. B. Gould, Jr. The new officers of the company are: Roscoe Hazard, president and manager; H. N. McKie, vice-president, and E. B. Gould, Jr., secretary and treasurer.

THE PROPOSED NEW AUSTRALIAN TARIFF.

FROM OUR SPECIAL CORRESPONDENT.

MELBOURNE, August 12, 1907.

THE Australian Federal elections of December last proved unmistakably the general desire for a strong protectionist tariff. In response to this mandate from the country the Government, on Thursday, August 8, brought down a new tariff schedule increasing duties all round and giving a decided preference to British goods. While it is probable that many of the items on the schedule will be revised when the House goes through the tariff, item by item, still it is not anticipated that material reductions will be made in any lines associated with the Hardware trade. The duties, however, on many lines will only operate conditionally on the passage of the Iron Bonus bill, and the issue of a certificate by the Minister that certain Iron manufactures have been sufficiently established in the Commonwealth.

Principal Changes in Hardware and Related Lines.

So far as American exporters of Hardware and related lines are concerned, the more noticeable features are as follows:

Fencing Wire of English make is to be admitted free, but a 10 per cent. duty goes on foreign importations. Nearly all Fencing Wire used in Australia comes from America or Germany.

Barbed Wire is raised from its old rate of 10 to 20 per cent. for British manufactured and 30 per cent. from other countries. A fair amount of this line also is of American make.

Wire netting is to carry a 25 per cent. preferential duty, and 30 per cent. if imported from foreign countries. The best and most expensive description of this line is 42 x 1 1/4 in. x 17 gauge, and this is the quality more generally in use.

Lamps and Lampware, a large proportion of which come from your country, will henceforward be subject to a duty of 25 per cent., while, if manufactured in the United Kingdom, they will only carry 15 per cent.

Stripper Harvesters are raised to £16 each and Stripper to £8, the metal parts of either being subject to a duty of 2 1/4 pence per pound.

Cream Separators, Horse Rakes, Maize Harvesters, Milking Machines, Potato Diggers, Sheep Shearing Machines, Threshing Machines, &c., carry 10 per cent., while British made goods come in free.

Horseshoe Nails are raised to 8 shillings 3 pence per hundredweight, as against 7 shillings 6 pence for British made.

Cutlery of all kinds, except Cutlery in part or wholly made up of gold or silver, is to carry 20 per cent. ad valorem, as against 15 per cent. from Britain.

Boilers, Pumps, Windmills, Elevating Conveying Machinery, Cranes, Lifts, &c., 30 per cent., as against 25 per cent. from Britain.

Typewriters and Covers, Sewing Machines, including Cabinets and Covers; Turning Machines, &c., 10 per cent. from foreign countries, but free if British made.

Saws, 25 per cent. ad valorem foreign; 20 per cent. British made.

Mining Engines and Machinery, 35 per cent. foreign; 25 per cent. British.

Corrugated Iron, formerly admitted at 15 per cent., will now be charged 20 per cent. from Great Britain and 25 per cent. from elsewhere.

Steam Road Rollers are to be increased from 12 1/2 per cent. to 25 per cent.

Electrical Machinery, also dutiable at 12 1/2 per cent. hitherto, is to be charged 25 per cent. from Great Britain and 30 per cent. from abroad.

The same duties are to be levied on Iron Pipes, formerly charged 20 per cent., and on Bolts and Nuts, formerly charged 12 1/2 per cent.

Wicker Ware, formerly 20 per cent., will henceforward be 40 per cent. from Great Britain and 45 per cent. from abroad. Basket Ware the same.

Casks and Barrels, hitherto free, when filled are dutiable at 20 per cent.; empty are to pay 35 per cent. all round.

Bicycles, formerly 20 to 25 per cent., are to be charged £5 or 25 per cent., whichever is highest, from Great Britain, and £5 5s. or 30 per cent. from foreign parts.

Rubber Goods are 5 per cent. from Great Britain; 10 per cent. from abroad.

Motor Cars are raised 35 per cent.

Motor Cycles, £10 10s. from Great Britain and 30 per cent. from elsewhere.

Buggies, formerly 25 per cent., are to be dutiable at £9 each from Great Britain and £9 18s. from elsewhere.

It is anticipated that this new tariff will yield an additional £800,000 per annum revenue. It need hardly be said that the Australian Hardware manufacturers are highly pleased with the tariff proposals.

Correspondence.

A Suggestion as to Catalogues and Discount Sheets.

To the Editor:

"If not, why not?"

About one-half the catalogues we get, sent out by manufacturers and jobbers, are without date, and many of them without either date or number to indicate whether they are current or ancient history, and occasionally we are favored with discount sheets without anything to indicate to which of several catalogues they apply.

An oversight of this kind is a serious handicap to an otherwise finely printed and illustrated book of reference that has no excuse from a business standpoint.

Will manufacturers and jobbers remember these things next time?

IOWA.

CHANGES IN LALANCE & GROSJEAN MFG. COMPANY.

THE death of A. J. Cordier, president of the Lalance & Grosjean Mfg. Company, some months ago, and the retirement, because of impaired health, of James Cochran, vice-president, July 1, after 37 years of faithful and unremitting service, has led to important changes in the executive force of the company. The principal officials now are: J. H. Walbridge, president, who has filled the office nearly a year, and the following, determined on at a board meeting September 11: J. D. Fleming, vice-president and treasurer; E. W. Ball, second vice-president; John H. Stevenson, secretary, and W. H. Dahman, superintendent of the Woodhaven factory. There has also been a thorough reorganization of the many departments of this pioneer and representative company, both at the factory, Woodhaven, L. I., N. Y., where the Agate Nickel-Steel Ware and other Sheet Metal Housefurnishing Goods are manufactured, and at the rolling mills, Harrisburg, Pa., where the company rolls its own sheets. In the general readjustment of both executive and mechanical departments the policy has been to recognize past faithful and efficient service by the promotion of subordinates in the younger grades, who have been trained in the business, to places of greater responsibility.

THE NORTHWESTERN STOVE REPAIR COMPANY, 225-235 West Twelfth street, Chicago, has issued its catalogue No. 25, comprising 1312 pages, bound in heavy covers. It is stated that the repairs which the company sells are made in its own foundry to fit the Stoves for which they are sold. The pages list approximately 60,000 Stoves and Hot Air Furnaces, and as these are made in a variety of sizes, the repairs to fit over half a million different Stoves and Furnaces are shown by means of the 7000 illustrations. This mammoth catalogue seems to be practically exhaustive in its completeness of a registration of Stove constructions and will be valuable as a directory because it covers goods made in all sections.

At a meeting of the Hardware merchants of Dayton, Ohio, held on the 16th ult., resolutions deplored the death of John Kramer were adopted. Mr. Kramer was one of the city's leading merchants, and stood very high both as a citizen and business man.

THE PAXTON HARDWARE MFG. COMPANY, Paxton, Ill., has recently acquired from the Sidway Mercantile Company the right to manufacture the Rotary Cake, Biscuit and Doughnut Cutters, a line which has become quite familiar to the trade.

REQUESTS FOR CATALOGUES, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM WEEKS-BETTS HARDWARE COMPANY, Prosperity, Mo., dealing in general Hardware, Paints and Oils and Mining Supplies, which has recently increased its capital stock from \$16,000 to \$60,000.

FROM JOHNSON-CLOYES HARDWARE COMPANY, Pocahontas, Ark., which has purchased the business of J. B. Avera and will handle Shelf and Heavy Hardware, Stoves, Implements, Paints, Vehicles, Harness, Mill and Blacksmiths' Supplies.

FROM J. S. HUHN, Hamden Junction, Ohio, who handles Hardware, Stoves, Tinware, Paints, Implements, &c.

FROM G. H. GLASER & SON, successors to G. H. Glasser in the Hardware business, at Stanton, Neb.

FROM DILLON & WEST, Yerington, Nev., who handle Shelf and Heavy Hardware, Mining Supplies, Paints, Sporting Goods, &c.

FROM J. S. NEAL & SONS, Rochelle, Texas, who have lately commenced the retail Hardware, Stove, Agricultural Implement, Sporting Goods, Buggy, Wagon, Harness and Furniture business.

PRICE-LISTS, CIRCULARS, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

F. LEWALD & CO., Chicago: Illustrated catalogue of Novelties, such as Buttonhooks, Coat, Trousers and Skirt Hangers, Cuff Fasteners, &c.

JOS. N. SMITH & CO., Detroit, Mich.: Catalogue D, referring to Automobile Hardware and Mountings.

NEW YORK HOLLOW WARE COMPANY, 245 Water street, New York: Revised price-list of Erie Extra Finished Hollow Ware, effective August 1, 1907.

A. GROTHWELL, 136 Liberty street, New York: Circular referring to Mogul Paints, Varnishes and Compounds.

BADGER BRASS MFG. COMPANY, Kenosha, Wis.: Advance catalogue of Solar Lamps and Acetylene Gas Generators for motor cars, cycles, carriages and boats.

KRAMER BROS. FOUNDRY COMPANY, Dayton, Ohio: Illustrated supplement to Cement Tool Catalogue No. 4.

HOXIE AMMUNITION COMPANY, Chicago: Illustrated booklet referring to Hoxie Expanding Bullets.

CASSADY-FAIRBANK MFG. COMPANY, Chicago: Attractive black and white circular referring to Marcel Wavers and Curlers.

BUTLER COMPANY, Butler, Ind.: Illustrated catalogue No. 16, referring to Butler Steel and Wood Windmills and Towers, Tanks, Tank Heaters, Pumps, Fittings and Tubular Well Supplies and Tools.

SCHUBERT BROS. GEAR COMPANY, Oneida, N. Y.: Illustrated catalogue and price-list of Vehicles in the white, with Bodies, Gears, Trimmings, Fittings, &c.

AKRON CULTIVATOR COMPANY, Akron, Ohio: Illustrated catalogue of Kraus and Kraus, Jr., Pivot Axle Sulky Cultivators; also illustrated catalogue of Akron Steel Wheelbarrow, Charging Barrows, Coal and Coke Wagons, &c.

L. L. LORD COMPANY, Meadville, Pa.: Illustrated catalogue and price-list No. 5, referring to Malleable Iron Gas Appliances.

WHITMAN & BARNES MFG. COMPANY, Chicago: Catalogue No. 65, dated August, 1907, referring to Diamond Hay Carriers, Forks, Pulleys, Slings and supplies.

PAXTON HARDWARE MFG. COMPANY, Paxton, Ill.: Illustrated loose leaf catalogue referring to an extensive line of Kitchen and House Furnishing Hardware.

MOTOR CAR EQUIPMENT COMPANY, 55 Warren street, New York: Illustrated catalogue referring to an extensive line of Automobile Supplies.

BEALL SHOVEL COMPANY, Alton, Ill.: Illustrated catalogue and price-list of Shovels, Spades, Scoops, &c.

BUTLER BROS., Chicago: "Our Drummer" catalogue for October, referring especially to Notions and fall and holiday goods.

OWENSBORO SHOVEL & TOOL COMPANY, Owensboro, Ky.: Illustrated price-lists, one relating to the company's line of Shovels, Spades and Scoops, and the other to Hoes, including Planters', Regular Cotton, Light Cotton, Southern Meadow and Regular Field.

MISCELLANEOUS NOTES.

Ross Bros. Company's Seed Case.

The Ross Bros. Company, Worcester, Mass., wholesale and retail merchants, handling seeds, farm machinery and supplies, wooden ware, poultry supplies, &c., is offering an attractive case for the accommodation and display of garden seeds. It contains 55 patented wire holders, so arranged that the entire front of each paper is exhibited to the full view of the customer. The company cleverly declares that the case catches trade, but does not catch dirt or dust.

Russell & Erwin Mfg. Co.

A pamphlet has recently been issued by Russell & Erwin Mfg. Company, New Britain, Conn., illustrating and listing the new line of lavatory hardware and fixtures which the company is now offering. The line includes about everything required in this connection, such as indicator bolts, latches, strikes or bumpers, partition clamps and supports, spring and clamp hinges, door pulls, coat and hat hooks, &c. The goods are made of cast bronze metal and are furnished in various finishes, including nickel plated, old copper mottled, dull brass, polished brass and polished bronze. The company states that the well known Russwin quality will be maintained in this line and that the illustrated pamphlets will be furnished to the trade on application.

The Waterville Shear.

The Waterville Cutlery Company, Waterville, Conn., is putting on the market the patented shear herewith



Fig. 1.—The Waterville Shear.

shown. The design of the device connecting the blades is to hold them in proper relation to each other, without becoming loosened through use. A bolt passes through the holes in the blades, upon which is a knurled thumb screw, on the underside of which are a number of radial teeth. In one side of one blade is a recess having a concaved bottom, within which lies a spring plate, formed with a head portion and a cupped portion. Through the head portion is an opening substantially of

the same diameter as the bolt, which is prevented from turning in this opening by a lug which projects into the groove of the bolt. The spring plate is cut open and one



Fig. 2.—Detailed View of Shear Parts.

edge is turned up to form a tooth. In its normal position the spring plate lies in the recess in the blade, supported at either end, with its tooth engaged with one of

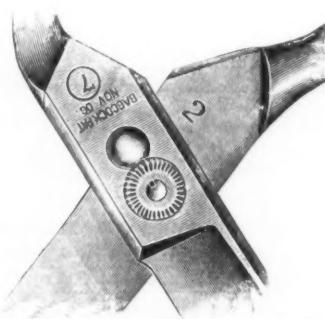
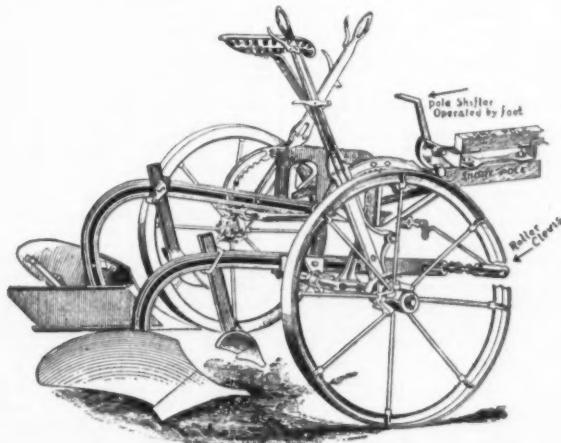


Fig. 3.—View of Blades When Joined.

the teeth upon the nut, thus preventing the nut turning when the shears are being used. To take off the nut, the spring plate is pushed down with the thumb, which disengages its tooth from those on the nut, when the nut can be loosened.

Wiard Two-Furrow Walking Gang Plow.

The plow here illustrated is made by Wiard Plow Company, Batavia, N. Y. It is two-furrow and cuts 22



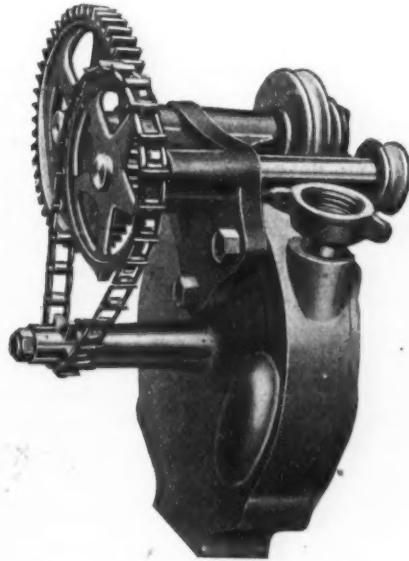
Wiard Two-Furrow Walking Gang Plow.

inches, 4 to 8 in. deep. The frame is constructed of high carbon steel, braced so as to be very rigid. The standards or main part of the plow bottoms are made so as to afford the greatest strength without unnecessarily adding to the weight. The wheels have adjustable wearing

parts and dustproof bearings. Levers are adjustable to suit all soils and conditions and the clevis is strong and adapted to all adjustments. Shinpieces and landslides are chilled iron and points are cast iron, plain or cutter, while moldboards are made of chilled or soft center steel, as ordered. It is claimed that the plow will run alone, the operator simply guiding the team; also that levers and wheels are so arranged that by means of a spring lift and the assistance of the horses the plows are easily raised out of the ground. Plows can be rigged with jointers, plain colters or rolling colters as wanted. They are made in right or left hand and are adapted to use with three horses abreast, the plow weighing with clevis 360 lb. It is asserted that with three horses and one man they will do the work usually requiring four horses and two men.

The Lippincott Three-Speed Water Motor.

The Lippincott S. M. Company, Newark, N. J., whose specialty for many years has been engine indicators, steam gauges, micrometers and other instruments of precision, has during the past year taken up the manufacture of water motors. In external appearance the company's motor is similar to several others, but presents some new features. Attention is called to the oval projection on each side of the case, which is so designed that water projected from the impact wheel is deflected twice, and is then conducted down and out without having any tendency to splash back into the buckets, thereby retarding the motion. The casing has three projections, and in its center a hole is drilled and tapped, thereby offering a ready means for the attachment of special countershafts, air pumps, bottle washers, egg beaters, massage

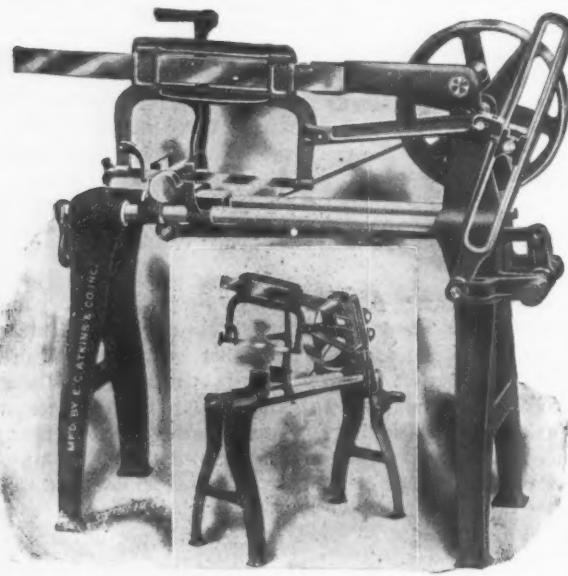


The Lippincott Three-Speed Water Motor.

vibrators, fans and numerous other devices which are made by the company. By this provision the merchant may sell the bare motor to a customer, and at the same time assure him that if subsequently he desired any of the attachments they could be procured and readily applied to the motor. The special countershaft shown herewith has lately been designed for use in connection with the motor, being attached to the 6 or 8 in. size. It has a five-tooth sprocket on the motor spindle, which operates a Locke steel chain run on to a 10-tooth sprocket on the secondary spindle. This larger sprocket carries a 10-tooth pinion, which runs with a 50-tooth gear on the third shaft. With this outfit it is pointed out that the user may run a fan, buff wheel, emery wheel or sewing machine pulley on the motor spindle, slower moving machinery from the secondary spindle, while ice cream freezers, grinders, &c., may be operated from the third spindle, which has great power and slow speed.

Kwick-Kut Hack Saw Machine.

E. C. Atkins & Co., Indianapolis, Ind., have recently put on the market the hack saw machine, two views of which are presented herewith. It is built on strong mechanical lines, all wearing parts being large and durable. The saw arm works on a flat guide and is babbitted, thus insuring durability and a straight cut and



Kwick-Kut Hack Saw Machine.

preventing breakage of blades. A split finger holds the blade in perfect alignment, while the frame is said to be free from vibration, thus enabling the saw to work smoothly, assuring a square cut and saving the necessity of filing, planing or smoothing up. A feature of the machine is the great rapidity with which it works, due in the first place to the quick return of the saw arm. The blade has a regular forward motion, but returns three times as fast. This is said to add 10 strokes per minute without danger to the blade. The second feature that adds speed is the fact that the entire saw blade is used from end to end. The machine adapts itself automatically to all sizes of cuts. Hand power may be used if desired and it can also be arranged to equip for electric power with either direct or alternating current.

Power is applied through the use of a friction wheel clutch. If desired, the frame may be thrown back, leaving the vise clear. The latter is equipped with right and left handed screw which holds the work firmly. There is an automatic attachment which throws the clutch and stops the machine as soon as the cut is made. The machine is sold under a guarantee as to material and workmanship and is made in three sizes: No. 1, having a capacity up to 4 x 4 in., No. 2, 5 x 5 in. and No. 3, 8 x 8 in.

The Leader Ice Scraper.

The Elmira Machine Works, Elmira, N. Y., is offering to the trade the ice scraper shown herewith. The tool is a very strong one, the handle being of hardwood, 1 3-16 in. in diameter and 4 ft. long. The blade is of 12-gauge steel, 6 1/2 x 4 1/2 in. in size, while the sockets are drawn from No. 18 steel. The edge is milled sharp. In attaching the handle to the blade the handle is left large at the lower end, but properly tapered as if an ordinary ferrule was to be placed on it. The two drawn steel sockets are then riveted to the blade, one on each side, and a saw cut is made in the handle, which is forced into the ferrules and over the blade, being then riveted in place.



The Leader Ice Scraper.

As a result, the tool is said to be very stiff, although the construction is not expensive and low prices can be made.

BENJAMIN S. ALDER COMPANY, 37 Warren street, New York, has been appointed selling representative for New York City and export territory of Jones of Binghamton, the well known Scale manufacturer. Gerry Jones is again in active management of this long established manufacturing business after an absence of several years. Benjamin S. Alder Company states that it is now prepared to furnish price-lists and quotations revised to date and will display at its address a complete line of samples.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils— $\frac{p}{lb}$

Linseed, City, raw.....	45 @ 46
City, Boiled.....	46 @ 47
State and Western, raw.....	4 @ 45
Raw, Calcutta, in bbls.....	70 @ ..
Lard, Extra Prime, Winter.....	74 @ 77
Extra No. 1.....	54 @ 57
No. 1.....	50 @ 53
Cotton-seed, Crude, f.o.b. mills.....	54 @ 55
Summer Yellow, f.o.b.	54 @ 55
Summer White.....	58
Yellow Winter.....	58
Sperm, Crude.....	59 @ 60
Natural, Winter.....	72 @ 73
Bleached Winter.....	75 @ 76
Bleached Winter, Extra.....	.. @ ..
Tallow, Prime.....	62 @ 64
Whale, Crude.....	35 @ 36
Natural Winter.....	48 @ 49
Bleached Winter.....	50 @ 51
Extra Bleached Winter.....	52 @ 53
Menhaden, Brown, Strained.....	38 @ ..
Light, Strained.....	38 @ ..
Northern.....	.. @ ..
Southern.....	.. @ ..
Cocoanut, Ceylon.....	10 lb 8 @ 8 1/2
Cocain.....	38 @ 40
Cod, Domestic, Prime.....	42 @ 44
Seal, Greenland.....	47 @ 50
Red, Elaine.....	47 @ 50
Saponified.....	10 lb 6 1/2 @ 7
Olive, Italian, bbls, Yellow.....	75 @ 80
Neatsfoot, Prime.....	56 @ 57
Palm, Lagos.....	10 lb 8 1/2 @ 7 1/2

Mineral Oils—

Black, 20 gravity, 25@30 cold test.....	10 gal.
20 gravity, 15 cold test.....	13 @ 13 1/2
Summer.....	12 @ 12 1/2
Cylinder, light filtered.....	10 @ 22
Dark, filtered.....	16 1/2 @ 17 1/2
Paraffine, 903-907 gravity.....	14 @ 14 1/2
905 gravity.....	13 @ 13 1/2
903 gravity.....	10 1/2 @ 11 1/2
Red.....	13 @ 14 1/2

Miscellaneous—

Barytes:	
White, Foreign.....	10 ton \$18.50@20.50
Amer. floated.....	10 ton 19.00@20.50
Off color.....	10 ton 13.00@16.50
Chalk, in bulk.....	10 ton 3.00@ 3.25
In bbls.....	100 lb .. @ ..
China Clay, Imported.....	10 ton 11.00@17.50
Cobalt, Oxide.....	100 lb 2.50@ 2.60
Whiting, Commercial.....	100 lb 4.50@ 5.2
Gilders.....	100 lb .50@ .65
Ex Gilders.....	100 lb .60@ .65
Putty, Commercial—$\frac{p}{lb}$	
In bladders.....	1.70 @ 1.85
In blis, or tubes.....	1.20 @ 1.45
In 1 lb to 5 lb cans.....	2.65 @ 2.95
In 12 1/2 to 50 lb cans.....	1.50 @ 1.90
Spirits Turpentine—$\frac{p}{gal}$	
In Oil bbls.....	54@55
In machine bbls.....	55 @ 55
Glue—	
Cabinet.....	12 @ 15
Common Bone.....	7 1/2 @ 9
Extra White.....	18 @ 24
Foot Stock, White.....	12 @ 14
Foot Stock, Brown.....	9 @ 11
German Hide.....	12 @ 18
French.....	10 @ 10
Irish.....	13 @ 16
Low Grade.....	10 @ 12
Medium White.....	14 @ 17
Gum Shellac—	
Bleached, Commercial.....	35 @ 38
Bone, Dry.....	45 @ 48
Button.....	40 @ 50
Diamond 1.....	45 @ 55
Fine Orange.....	45 @ 50
G. A. Garnet.....	42 @ 43
Kal. Button.....	23 @ 25
D. C. Octagon B.....	56 @ 57
T. N. V. S. O.....	51 @ 52
55 @ 57	
Colors In Oil—	
Black, Lampblack.....	12 @ 14
Blue, Chinese.....	36 @ 46

Blue, Prussian.....	32 @ 35
Blue, Ultramarine.....	13 @ 16
Brown, Vandyke.....	11 @ 14
Green, Chrome.....	12 @ 15
Green, Paris.....	6 @ 24
Blue, Celestial.....	4 @ 6
Blue, Chinese.....	30 @ 33
Sienna, Raw.....	12 @ 15
Sienna, Burnt.....	12 @ 15
Cumber, Raw.....	11 @ 14
Umber, Raw.....	11 @ 14
Brown, Sienna.....	12 @ 15
Carmine, No. 40.....	33 @ 35
Green, Chrome ordinary.....	34 @ 25
Green, Chrome pure.....	17 @ 25
Lead, Red, bbls, 1/2 bbls, kegs.....	17 @ 25
Litharge, bbls, 1/2 bbls, kegs.....	7 @ 7
Other, American.....	10 ton \$8.50@16.00
American, Golden.....	24 @ 34
French.....	1 1/4 @ 2
Foreign, Golden.....	3 @ 4
Orange Mineral, English.....	10 @ 12
French.....	11 1/4 @ 12
German.....	10 @ 12
American.....	3 @ 9
Red, Indian, English.....	4 1/4 @ 6
American.....	3 @ 3 1/2
Red, Turkey, English.....	4 @ 10
Red, Tuscan, English.....	12 @ 19
Red, Venetian, Amer. 100 lb \$0.50@1.25	
English.....	100 lb \$1.15@1.60
Sienna, Italian, Burnt and	
Zinc, French:	
Black, Ivory.....	16 @ 20
Lamp, commercial.....	4 @ 6
Blue, Celestial.....	4 @ 6
Blue, Chinese.....	30 @ 33
Blue, Prussian.....	28 @ 32
Blue, Ultramarine.....	34 @ 15
Black, Ivory.....	16 @ 20
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Blue, Ultramarine.....	34 @ 15
Black, Ivory	

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Price.—A range of prices is indicated by means of the symbol @. Thus 33 1/3 @ 33 1/3 & 10% signifies

that the price of the goods in question ranges from 33 1/3 per cent. discount to 33 1/3 and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1907, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—“The Iron Age Standard Hardware Lists” contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33 1/3%
Notts.....10%
Zimmerman &c—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers. 8 oz. pairs Nos. 1, \$0.75; 2, \$0.60; 4, \$1.00; 5, \$0.50. Fernald Quick Shifter, 8 oz. pairs.....\$2.00@\$3.00

Anvils—American—

Elgie Anvils.....\$1 lb. @8 1/2¢
Hay-Budden, Wrought.....9 1/2@9 1/2¢
Trenton.....\$1 lb. 9 1/2@9 1/2¢

Imported—

Peter Wright & Sons, \$1 lb. 84 to 349 lb. 11¢; 350 to 600 lb. 11 1/2¢.

Anvil, Vise and Drill—

Millers Falls Co. \$18.00.....15&10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.33 1/3%

Augers and Bits—

Com. Double Spur.....75@80%
Jennings' Patn., Bright, 65@10@70%
Black Lip or Blued.....65@65%

Boring Mach. Augers.....70%
Ford's Auger and Car Bits.....40&10%
Ft. Washington Auger Co., Card's.....35%

Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list, 25&7 1/2%

No. 30, R. Jennings' list.....50%
Russell Jennings.....25&10@2 1/2%
L'Hommedieu Car Bits.....15%

Mayhew's Countersink Bits.....45%
Pugh's Black.....35%

Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....50%
Snell's Bell Hangers Bits.....50%
Snell's Car Bits, 12-in. twist.....50%
Snell's King Auger Bits.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's Pattern, No. 1, \$1 doz. 25%;
No. 2, \$18.....60&10%
Ford's, Clark's Pattern.....65&5%
C. E. Jennings & Co. Steer's 1'at. 25%
Lavigne Pat., small size, \$18.00; large size, \$26.00.....60&10%
Swan's.....60%

Gimlet Bits—

Per gro.

Common Dble. Cut.....\$3.00@\$3.25

German Pattern, Nos. 1 to 10, 45.75; 11 to 13, 55.75

Hollow Augers—

Bonney Pat., per doz.\$6.50@7.00
Ames.....25&10%
Universal.....20%

Ship Augers and Bits—

Ship Augers.....40&10%

Ford's, Clark's Pattern.....33 1/2@5%

C. E. Jennings & Co. Steer's 1'at. 25%
L'Hommedieu's.....6%

Watrous'.....33&7 1/2%

Snell's.....48%

Awl Hafts—See Handles, Mechanics' Tool.

Awls—

Brad Awls: Handled.....gro. \$2.75@3.00

Unhandled, Shildered.....gro. 65@85%

Peg Awls: Unhandled, Patent.....gro. 66@70%

Scratch Awls: Handled, Com. gro. \$3.50@4.00

Handled, Socket, gro. \$1.50@1.90

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.

First Quality.....\$1.75@1.50

Second Quality.....\$1.25@1.40

Double Bit, base weights:

First Quality.....\$7.00@7.50

Second Quality.....\$6.50@6.75

Axle Grease—

See Grease, Axle

Axes—

Iron or Steel

Concord, Loose Collar, 4 1/2@5¢

Concord, Solid Collar, 4 1/2@5¢

No. 1 Common, Loose, 3 1/4@4 1/4¢

No. 1/2 Com., New Style, 4 1/2@5¢

No. 2 Solid Collar, 4 1/2@5¢

Axle Patent: Nos. 7, 8, 11 and 12.....60@65%

Nos. 13 to 14.....60@65%

Nos. 15 to 18.....65@70%

Nos. 19 to 22.....65@70%

Boxes, Axle—

Common and Concord, not turned

lb. 5@6¢

Common and Concord, turned,

lb. 6@7¢

Half Patent.....lb. 9 1/2@10¢

Bait—

Fishing—

Hendryx:

A Bait.....25%

B Bait.....20%

Competitor Bait.....20&5%

Balances—

Sash—

Caldwell new list.....50%

Pullman.....50@10@50%

Spring—

Spring Balances.....50@10@60%

Chatillon's:

Light Spg. Balances.....50@50&10%

Straight Balances.....40@40@10%

Circular Balances.....50@10%

Large Dial.....30%

Barb Wire—See Wire, Barb.

Bars—

Crow—

Steel Crowbars, 10 to 40 lb.

per lb. 25@3¢

Towel

No. 10 Ideal, Nickel Plate, \$1 gro. \$2.50

Beams, Scale—

Scale Beams.....40%

Chatillon's No. 1.....30%

Chatillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:

No. 12 Wire Coppered \$1 doz. 80¢;

Tinned.....\$0.85

No. 11 Wire Coppered \$1 doz. 15¢;

Tinned.....\$1.20

No. 10 Wire Tinned.....\$1 doz. \$1.50

Beaters, Egg—

Holt-Lyon Co.:

Holt, per doz. No. 5, Jap'd, \$0.80;

No. A, Jap'd, \$1.15; No. B, Jap'd, \$1.85;

No. 6, Jap'd, \$1.65; No. 7, \$1.35;

Lyon, Jap'd, per doz., No. 2, \$1.35.

Improved Dover, per gro. No. 60;

No. 75, \$6.50; No. 100, \$7.00;

No. 102, Tind'd, \$8.50; No. 150, Hotel, \$15.00;

No. 152, Hotel Tind'd, \$17.00; No. 200, Tumbler, \$8.50;

No. 300, Mammoth, per doz., \$25.00.

Turner & Seymour Mfg. Co.: \$6.50

T. & S. Dover.....\$6.50

Bellows—

Blacksmith, Standard List.

Split Leather.....60@10@65%

Grain Leather.....50@50@10%

Hand—

Inch.....6 7 8 9 10

Doz. \$5.00 5.50 6.00 6.50 7.50

Molders—

Inch.....10 12 14 16

Doz. \$7.50 9.00 12.00 15.00

Bells—

Cow—

Ordinary Goods.....75@75@75@75

High grade.....70@10@75@75@75

Jersey.....75@75@75@75

Texas Star.....50%

Door—

Home, R. & E. Mfg. Co.'s.....55&10%

Ives' Patent Door.....55%

Ives' Wrought Metal.....45%

Hand—

Polished, Brass.....50@50@10%

White Metal.....50@50@5%

Nickel Plated.....50%

Swiss.....50%

Coue's Globe Hand Bells.....33 1/3@33 1/3

Miscellaneous—

Farm Bells.....lb. 2 1/2@2 1/2¢

Church and School.....60@60@5%

Hand—

Common Iron.....50@10@10%

Norway Iron.....50@10%

American Screw Company:

Norway Phila., list Oct. 16 '04...80%

Eagle Phila., list Oct. 16 '04...82 1/2%

Bay State, list Dec. 28 '04...80%

Franklin Moore Co.:

Norway Phila., list Oct. 16 '04...80%

Eagle Phila., list Oct. 16 '04...82 1/2%

Russell, Burdall & Ward Bolt &

Nut Co.:

Empire, list Dec. 28 '04...80%

Norway Phila., list Oct. 16 '04...80%

Eagle:

Shelby Co.:

Tiger Brand, list Dec. 28 '04...80%

Plula, Eagle, list Oct. 16 '04...82 1/2%

Union Nut Co.:

Tire Bolts.....72 1/2%

Borers, Bung—

Borers Bung, Ring, with Handle:

Inch.....1 1/2 2 1/2 3 1/2 2

Per doz. \$1.80 5.50 6.40 8.00

Inch.....2 1/2 3 1/2 4 1/2 5 1/2

Per doz. \$5.65 11.50

Enterprise Mfg. Co. No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.25%

Langdon, New Langdon and Langdon Impr'ed. 20&10%;

Langdon Acme15&10%

Perfection40%

Seavey45%

Braces—

Common Ball, American\$1.50

Barber's50@10@10@60@10%

Fray's Genuine Spofford's:

Per doz. to 120, \$1 to 123, 207 to

41560%

C. E. Jennings & Co.50@5%

Mayhew's Ratchet60%

Mayhew's Quick Action Hay Pat.50%

Villers Falls Drill Braces.25&10%

P. S. & W. Co., Peck's Pat. 60&10%

Brackets—

Wrought Steel.70@10@75@10%

Bradley Metal Clasp.80&10@80@10&5%

Griffin's Pressed Steel.75@75@10%

Folding Brackets70@10%

Taplin Victor Handy Egg Beater Bracket\$0.50

Bright Wire Goods—

See Wire and Wire Goods.

Broilers—

Common Mfg. Co.75&20%

Wire Goods Co.75%

Buckets, Galvanized—

MTG'r's list, price per gross.

Quart. 10 12 14 16

Water, Rgy.25.35 28.00 32.00

Hendryx Bronze; Series 700, \$80.30%;
Hendryx Enamelled.....\$5.00

Calipers—See *Compasses*.

Calks, Toe and Heel—

Blunt, 1 prong, per lb., 41¢@43¢
Sharp, 1 prong, per lb., 43¢@54¢
Burke's, Blunt, 4¢@5¢; Sharp, 4¢@5¢
Lautier, Blunt, 4¢@5¢; Sharp, 4¢@5¢
Perkins', Blunt, 3 lb., 36¢; Sharp, 4.15¢

Can Openers—

See *Openers, Can*.

Caps, Percussion—

Eley's E: B.....\$2@55¢
G.....per M \$4@35¢
F. L.....per M \$4@42¢
G. E.....per M \$8@50¢
Musket.....per M \$2@63¢

Primers—

Berdan Primers, \$2 per M...20¢@25¢
Primer Shells and Bullets...15¢@10¢
All other primers per M...\$1.52@1.60

Carpet Stretchers—

See *Stretchers, Carpet*.

Cartridges—

Blank Cartridges:
32 C. F., \$5.50.....10¢@5%
38 C. F., \$7.00.....10¢@5%
22 cal, Rim, \$1.50.....10¢@5%
32 cal, Rim, \$2.75.....10¢@5%
B. B. Caps, Con. Ball, Sicyd, \$1.50
B. B. Caps, Round Ball...\$1.49
Central Fire.....15¢
Target and Sporting Rifle...15¢@5%
Primed Shells and Bullets...15¢@10¢
Rim Fire, Sporting.....15¢
Rim Fire, Military.....15¢@5%

Casters—

Bed.....65¢@10%
Plate.....60¢@5%
Philadelphia.....70¢@10%
Acme, Ball Bearing.....35¢
Gem (Roller Bearing)...70¢@10@10¢
Steel Gem.....20¢
Standard Ball Bearing.....45¢
Yale (Double Wheel) low list...10¢@10%

Cattle Leaders—

See *Leaders, Cattle*.

Chain, Proof Coil—

American Coil, Straight Link:
3 1/2 5-16 3/8 7-16 1/2 9-16
88.77 6.17 5.02 4.57 4.37 4.27 4.22
5/8 3/4 7/8 to 1 1/8 to 1 1/4 inch.
\$4.17 4.07 4.02 4.02

In case 1018, deduct 25¢.

German Coil:
6-0 to 1.....70¢@10@10@10%
2 and 3...60¢@10@10@10@10@10%
4, 5 and 6...50¢@10@10@10@10%
Halter.....35¢@5%

Halter—

Halter Chains.....\$0@60¢@5%
German Pattern Halter Chains,
list July 24, '97.....60¢@10¢@5%
Covert Mfg. Co.....
Halter.....35¢@5%

Cow Ties—

See *Halters and Ties*.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6 1/2-6-3, Straight, with ring...\$28.00
6 1/2-6-2, Straight, with ring...\$29.00
6 1/2-8-2, Straight, with ring...\$32.00
6 1/2-10-2, Straight, with ring...\$37.00
NOTE—Add 2¢ per pair for Hooks.
Twist Traces; add per pair for Nos. 2
and 3, 2¢; No. 1, 8¢; No. 0, to price of
Straight Link.

Standard Traces, Wag-
on Chain, &c. \$0@10@10@10@10@5%

Miscellaneous—

Jack Chain, list July 10, '98:
Iron.....\$0@10%
Brass.....50¢@10%
Safety and Plumbers' Chain,
60¢@10%
Gal. Pump Chain...lb. 41¢@45¢
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stal-
lion.....40¢
Oneida Community:
American Halter, Dog and Kennel
Chains...35¢@2@10%
Niagara Dog Leads and Kennel
Chains.....45¢@65¢
Wire Goods Co.:
Dog Chain.....70¢
Universal Dbl.-Jointed Chain.....50¢

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain.....60¢
Pullman:

Bronze Chain, 50%; Steel Chain
60@10%
Sash Chain Attachments, per set, 8¢
Aluminoy Sash Ribbon, per 100
ft.....\$1.25@33.00
Sash Ribbon Attachments, per set, 8¢

Chalk—(From Jobbers.)

Carpenters' Blue...gro. \$0@55¢
Carpenters' Red...gro. 45@5¢@5¢
Carpenters' White...gro. 40@4¢

Checks, Door—

Bardsley's.....45¢
Pullman, per gro. \$5.00
Baldwin.....35¢@5%

Chests, Tool

American Tool Chest Co.:
Boys' Chests, with Tools.....50¢
Youth's Chests, with Tools.....50¢
Gentlemen's Chests, w/ Tools, 25¢
Farmers', Carpenters', etc., Chests,
with Tools.....50¢
Manufacturers' and Pipe Fitter
Chests, Empty.....45¢
Tool Cabinets.....45¢
C. E. Jennings & Co.'s Machines,
Tool Chests.....75¢@10%

Chisels

Socket Framing and Firmer

Standard List.....75¢@10%

C. E. Jennings & Co.:

Socket Firmer No. 10.....25¢@7½%

Socket Framing No. 15.....25¢@7½%

Swan's.....66¢@67½%

L. & I. J. White Co.30¢@30@5%

Tanged

Tanged Firmer.....30¢@5@3%

Buck Bros.30¢@5@3%

C. E. Jennings & Co. Nos. 191, 181, 25

L. & I. J. White Co.35¢@5%

Cold

Cold Chisels, good quality...15¢@15¢

Cold Chisels, fair quality...11¢@12¢

Cold Chisels, ordinary...9¢@10¢

Chucks

Almond Drill Chucks.....35¢

Almond Turret Six-Tool Chuck.....40¢

Empe...25¢

Blacksmiths'...25¢

Loco. Drill Chucks.....35¢

Loco. Drill Chuck, Positive Drive...25¢

Skinner Patent Chuck:

Independent Lathe Chucks.....35¢

Universal, Reversible Jaws.....35¢

Combination Reversible Jaws.....35¢

Drill Chucks, New Model, 25¢

Standard, 45%; Skinner Pat...45¢

Positive Drive...45¢

Planer Chucks.....20¢

Face Plate Jaws.....35¢

Standard Tool Co.:

Improved Drill Chuck.....45¢

Union Mfg. Co.:

Combination, Nos. 1, 2, 3, 4, 5, 6,
7, 8 and 17, 40%; No. 21.....35¢

Scroll Combination, Nos. 83 and
84.....30¢

Geard. Scroll, Nos. 33 and 35...35¢

Independent Iron, Nos. 18 and 318...35¢

Independent Steel, No. 64...35¢

Union Drill, Nos. 000, 00, 100, 101,
102, 103, 104...35¢

Union Czar Drill.....25¢

Universal, 11, 12, 16, 17, 13, 14, 15...40¢

Universal, No. 42.....35¢

Iron Face Plate Jaws, Nos. 28, 30,
48 and 50...35¢

Steel Face Plate Jaws, Nos. 70 and
72.....30¢

Westcott Patent Chucks:

Lathe Chucks.....50¢

Little Giant Auxiliary Drill...50¢

Little Giant Double Grip Drill...50¢

Little Giant Drill, Improved...50¢

Oneida Drill...50¢

Scroll Combination Lathe...50¢

Clamps

Adjustable, Hammers'...20@20@5%

Carriage Makers, P. S. & W. Co.50@10%

Resley, Parallel...35@10%

Myers' Hay Rack.....45¢

Lineman's Swedish Neverturn...65¢

Wood Workers, Hammers...40@10%

Saw Clamps, see *Vises, Saw Fliers*.

Cleaners, Drain

Iwan's Champion, Adjustable...50¢

Iwan's Champion, Stationary...40¢

Sidewalk

Star Socket, All Steel, \$1.05 net

Star Shank, All Steel, \$1.05 net

W. & C. Shank, All Steel, \$1.05 net,
7½ in., \$3.00; 8 in., \$3.25

Cleavers, Butchers'

Foster Bros.30¢

Fayette R. Plumb.....30¢

L. & I. J. White Co.30¢

Clippers, Horse and Sheep

Chicago Flexible Shaft Company:

1902 Chicago Horse, each, \$10.75

20th Century Horse, each, \$10.00

Lightning Belt Horse, each, \$10.00

Chicago Belt Horse, each, \$20.00

Stewart's Enclosed Gear Horse, each...\$1.75

Stewart's Patent Sheep Shears, each...\$1.75

Shearing Machine, each...\$1.75

Stewart Enclosed Gear Shearing Machine, No. 8, each...\$0.75

Clips, Axle

Regular Styles, list July 1, '05, 80¢@80@10%

Cloth and Netting, Wire

—See *Wire, &c.*

Cocks, Brass

Hardware list:

Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c.

60¢@10@70%

Compression Bibbs...55¢@10@60%

Coffee Mills

See *Mills, Coffee*.

Collars, Dog

Nickel Chain, Walter B. Stevens & Son's list.....40%

Leather, Walter B. Stevens & Son's list.....40%

Compasses, Dividers, &c.

Ordinary Goods.....70¢@10@75%

Wm. Schollom Co.:

Excelsior Dividers.....60%

Lodi Dividers.....70@10%

Checks, Door

Bardsley's.....45¢

Pullman, per gro. \$5.00

Enterprise.....35¢@5%

Chests, Tool

American Tool Chest Co.:

Boys' Chests, with Tools.....50¢

Youth's Chests, with Tools.....50¢

Gentlemen's Chests, w/ Tools, 25¢

Farmers', Carpenters', etc., Chests,
with Tools.....50¢

Manufacturers' and Pipe Fitter
Chests, Empty.....45¢

Chests, Empty.....45¢

Tool Cabinets.....45¢

C. E. Jennings & Co.'s Machines,
Tool Chests.....75¢@10%

Chisels

Socket Framing and Firmer

Standard List.....75¢@10@10%

C. E. Jennings & Co.:

Socket Firmer No. 10.....25¢@7½%

Socket Framing No. 15.....25¢@7½%

Swan's.....66¢@67½%

L. & I. J. White Co.30@30@5%

Conductor Pipe

L. C. L. to Dealers:

Galvanized Charcoal Copper.

Steel. Iron. 14, 16@20 oz.

Eastern: 50¢@17½%

70% 60¢@17½%

Central: 70% 60¢@10%

70@5% 60¢@10%

Western and Southern: 30@7½%

No. Western: 70% 60¢@7½%

60@30% 60¢@10%

No. Western: 65¢@5% 60¢@5%

60@7½% 60¢@10%

Terms, 60 days; 2% cash 10 days. Factory
shipments generally delivered.

See also *Conductor Pipe and Elbows*.

Elbows and Shoes

Factory ship, men's, all territories:

Galv. Steel and Galv. C. I.

Standard Gauge.....80%

No. 28.....20%

No. 21.....25%

No. 22.....20%

Copper.....40@10%

Elbows, Stove Pipe

Edwards, Standard Blue.....40@10@10%

Edwards, Royal Blue.....40@10@10@10%

Reeves, Dover, one piece.....40@10@10%

Emery, Turkish

4 to 5 to

46: 5 to 5¢ to

5¢ to 5¢ to

D. & H. Scovil..... 27 1/2%
Am. Fork & Hoe Co. (Scovil Pattern)..... 60%
Handled—

NOTE.—Many advertisers are selling from the list of September 1, 1904, but many goods are still using list of August 1, 1904, or setting at net prices.

Cronk's Wedding, No. 1, \$2.00; No. 2, \$2.50
Star Double Bit..... \$3.20
Ft. Madison Cotton Hoe..... 108 1/2%
Ft. Madison Crescent Cultivator Hoe..... 108 1/2%
@ doz.
Ft. Madison Mattock Hoe.....
Regular Weight..... 1/2 doz. 40%
Tapered..... 1/2 doz. 41%
Ft. Madison Sprouting Hoe..... 1/2 doz.
60%
Ft. Madison Dixie Tobacco Hoe.....
75&10%
Kretzinger's Cut Easy..... 70&10%
Warren Hoe..... 45&10%
W. & C. Ivanhoe..... 75&10%
B. B. 6 in. Cultivator Hoe..... \$3.40
B. B. 6 1/2 in. \$3.50
B. B. 6 1/2 in. \$3.50
W. & C. L'vning Shovel Hoe, 1/2 doz. \$5.25

Hoisting Apparatus— See Machines, Hoisting.

Holders—Bit—

Angular, 1/2 doz. \$24.00..... 45&10%
Door—
Bardsley's, Iron, 40%; Brass and
Bronze..... 25%
E. pure..... 50%
Pullman..... 35%
Richards' Mfg. Co.: No. 117, Ever-
ready, 40%; Nos. 118, 119, Sure
Grip..... 35%
Superior..... 35%
File and Tool—

Nicholson File Holders and File
Handles..... 33%@40%

Fruit Jar—
Triumph Fruit Jar Holder, 1/2 gross,
\$10.80; 1/2 doz. \$1.25

Trace and Rein—
Fernald Double Trace Holder, 1/2 doz.
pairs..... 1/2 doz. \$1.25
Dash Rein Holder, 1/2 doz. pairs. \$1.25

Hones—Razor—
Pike Mfg. Co., Belgian and Swaty,
50%; German..... 35%
Hooks—Cast Iron—

Bird Cage, Reading..... 40%
Clothes Line, Reading List..... 40%
Coat and Hat, Reading..... 45&20%
Coat and Hat, Wrightsville..... 60&5%
Harness, Reading List..... 40%
Wire—

Belt..... 80%
Wire C. & H. Hooks..... 75@1/2%
Bradley Metal Clasp Wire, Coat and
Hat, 70&10%; Ceiling..... 70&10%
Columbian Hdw. Co., Gem..... 70&10%
Parker Wire Goods Co., King, 70&10%
Wire Goods Co.:
Acme, 60&10%; Chief, 70%; Crown,
75%; Czar, 65%; V Brace, 75%;
Czar Harness, 50&10%.

Wrought Iron—
Box, 6 in., per doz., \$1.00; 8 in.,
\$1.25; 10 in., \$1.50.
Cotton..... 1/2 doz. \$1.05@\$1.25
Wrought Staples, Hooks, &c.—
See Wrought Goods.

Miscellaneous—
Hooks, Bench, see Stops, Bench.
Bush, Light, doz., \$6.20; Medium,
\$6.75; Heavy, \$7.65

Grass, best, all sizes, per doz. \$3.00
Grass, common grades, all sizes,
per doz. \$1.75

Whiffetree..... 1b. 5%@6%

Hooks and Eyes:

Brass..... 60@60&10%
Malleable Iron..... 70@70&10%
Cove, Mfg. Co., Gate and Scuttle
Hooks..... 40%
Ft. Madison Cut-Easy Corn Hooks,
1/2 in. 1b. 32 1/2 net

Turner & Stanton C. Cup and
Shoulder..... 80&10%
Bench L. o. 1—See Beach Stoops.
Corn Hooks—See Knives, Corn.

Horse Nails—
See Nails, Horse.

Horseshoes—
See Shoes, Horses.

Hose, Rubber—
Garden Hose, 3/4-in.:

Competition..... ft. 5 @ 6¢
3-ply Guaranteed, ft. 8 @ 9¢
4-ply Guaranteed, ft. 10 @ 11¢

Cotton Garden, 3/4-in., coupled:
Low Grade..... ft. 8 @ 9¢
Fair Quality..... ft. 10 @ 11¢

Irons—Sad—
From 4 to 10..... 1b. 3 @ 31/2¢
B. B. Sad Irons..... 1b. 31/2 @ 31/2¢
Mrs. Potts', cents per set:

Nos. 55 60 65
Jap'd Tops..... 85 80 95 91
Tin'd Tops..... 88 85 95 95

New England Pressing, 1b. 31/2 @ 4¢

Bar and Corner—
Richards' Mfg. Co., Bar, 60&10%;
Corner..... 60%
Pinking—

Pinking Irons..... doz. 60¢

Irons, Soldering
See Covers.

Jacks, Wagon—
Cover, Mfg. Co.:
Auto Screw..... 30&2%; Steel, 45%
Lockport..... 50%

Lane's Steel..... 30&5%
Richards' Fiber Steel, No. 200..... 30&5%
Smith & Hemenway Co. s..... 25%

Ladder—
Richards' Mfg. Co., Ladder Jacks. 50%

Kettles—

Brass, Spun, Plain..... 20@25%
Enamelled and Cast Iron—See Ware,
Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros. Butcher, &c. 30%
Wilkinson Shear & Cutlery Co. 60%

Corn—

Columbian Cutlery Co., Wilcut
Brand Knives and Hooks..... 60%

Washington Acme, 1/2 doz. \$2.65

Dent, \$2.75; Adj. Serrated, \$2.20;

Serrated, \$2.15; Yankee No. 1, \$1.50;

Yankee No. 2, \$1.15.

Drawing—

Standard List, 75&5@75&10%
C. E. Jennings & Co., Nos. 45, 46,

25&7%
Jennings & Griffin, Nos. 41, 42,

66&7%
Swan's 66&7%
Watrous 16%
L. & I. J. White 20&5@25%

Hay and Straw—

Serrated Edge, per doz. \$0.50@5.75

Iwan's Sickle Edge, 1/2 doz. \$9.50

Iwan's Serrated, 1/2 doz. \$10.00

Miscellaneous—

Farrier's doz. \$3.00@3.25

Wostenholm's 1/2 doz. \$3.00@3.25

Knobs—

Base, 2 1/2 inch, Birch, or Maple,
Rubber Tip, 1/2 gro. \$1.25@\$1.40

Carriage, Jap., all sizes gro. 40@45¢

Door, Mineral doz. 65@70¢

Door, Por. Jap'd doz. 70@75¢

Door, Por. Nickel doz. \$2.05@2.15

Bardsley's Wood Door, Shutters, &c. 15%

Lacing, Leather—

See Belting, Leather—

Ladders, Store, &c.—

Allith' Mfg. Co., Reliable..... 50%

Lane's Store 25%

Myers' Noiseless Store Ladders..... 45%

Richards' Mfg. Co.:

Improved Noiseless, No. 112, 50%

Chimax Shelf, No. 113, 50%

Trolley, No. 109, 50%

Ladies, Melting—

L. & G. Mfg. Co., (low list) 20%

P. S. & W. 40&10%@40%

Reading..... 60%

Lanterns—Tubular—

Regular, No. 0, doz. \$1.35@4.50

Side Lift, No. 0, doz. \$1.60@4.75

Hinge Globe, No. 0, doz. \$4.00@4.75

Other Styles..... 40@4.75@10%

Bull's Eye Police—

3-inch \$4.25@4.50

Latches—Thumb—

Roggins' Latches, with screw... doz. 55@40¢

Door—

Allith' Mfg. Co., Reliable and Alle-
gator, 50%; Reliable Cold Storage, 50%

Crouse & Carrier Mfg. Co., No. 101,

Style A, Low Wheel..... 70@10%

Style B, Low Wheel..... 70@5%

Style C, High Wheel, spec. discr. 70@10%

Continental, 50%..... 60%

Great American, 50%..... 70@10%

Great American Ball B'g, new list, 70%

Quaker City, 50%..... 70@10%

Pennsylvania, 50%..... 60%

Pennsylvania, Jr., Ball Bearing, 50@10@5%

Pennsylvania, Golf..... 50%

Pennsylvania Horse..... 33 1/2@5%

Pennsylvania Pony..... 40@5%

Granite State:

Style A, Low Wheel..... 70@10%

Style B, Low Wheel..... 70@5%

Style C, High Wheel, spec. discr. 70@10%

Style D, High Wheel, spec. discr. 70%

Styles M. S., C. K., T.... 70@10%

Style A, all Steel..... 60@10%

Style E, High Wheel..... 100@10%

Drexel and Gold Coin, special list, 40%

Horse 40@5%

Pony 40@5%

36-in. Horse 30@10%

Eagle Horse 30@5%

I. X. L. Horse 50%

Nails—

Wire Nails and Brads, Mis-
cellaneous 87 1/2@87 1/2@10%

Cut and Wire. See Trade Report.

Hungarian, Finishing, Upholster-
ers &c. See Tacks.

Horse—

Nos. 6 7 8 9 10

Anchor 23 21 20 19 18

Coleman 13 12 11 11 11

New Haven 23 21 20 19 18

Livingston 19 18 17 16 16

Western 9 8 7 6 5

Jobbers' Special Brands..... per lb. 9@10¢

Picture—

1/2 2 2 1/2 3 in.

Brass H'd, 55 55 60 70 ... gro.

Por. Head... 1.10 1.10 1.10 ... gro.

Nippers—

See Pliers and Nippers.

Nuts—

Gold Punched: Off list.

Square, Blank or Tapped, 4.80¢

Hexagon, Blank or Tapped, 5.10¢

Square, B'lk, C, T, & R, 5.10¢

Hexagon, B'lk, C, T, & R, 5.70¢

Hot Pressed:

Square, Blank 5.30¢

Hexagon, Blank 5.70¢

Square, Tapped 5.20¢

Hexagon, Tapped 5.60¢

Oakum—

Best lb. 61¢

U. S. Navy lb. 6¢

Navv. lb. 5¢

Plumbers' Spun Oakum 5¢@6¢

In carloads lots 1/4 lb. 7¢, f.o.b.

New York.

Picks and Mattocks—

List, Feb. 25, 1899. 70&5@70&10%

Cronk's Handled Garden Mattock,

1/2 doz. No. 2, \$2.60; No. 3, \$6.40.

Oil Tanks—See Tanks, Oil.

Oilers—

Brass and Copper 50@10%

Tin or Steel 65@10@5@70%

Zinc 65@10@5@70%

Chase or Paragon:

Brass and Copper 50@10%

Tin or Steel 65@10%

Zinc 65@10@5@70%

Malleable, Hammers' Improved, Nos.

1, 2, 12 and 13. 20%; Old Pattern, Nos.

1, 2, 3, 50%.

American Tube & Stamping Co.:

Spring Bottom Cans 70@70&10%

Railroad Oilers, &c. 60@60@10%

Openers—Can—Per doz.

Sprague, Iron Handle 30@35¢

Sprague, Wood Handle 35@45¢

Sardine Scissors 1.75@3.00

Yankee Can and Bottle Opener,

1/2 doz., net, \$0.75; Little Gem,

1/2 doz., net, \$0.65

Egg—

Hartigan Nickel Plate, 1/2 doz., \$2.00;

Silver Plate, 1/2 doz., \$1.00;

Rubber—

(Fair quality goods.)

Sheet, C. I. 11@12¢

Sheet, C. O. S. 11@12¢

Sheet, C. B. S. 12@13¢

Sheet, Pure Gum 30@45¢

Sheet, Red 40@50¢

Jenkins' '96, 1/2 lb. 80¢

Miscellaneous—

American Packing, lb. 7@10¢

Cotton Packing, lb. 16@25¢

Italian Packing, lb. 9@12½¢

Jute 1/2 lb. 4¢@4½¢

Russia Packing, lb. 8@11¢

Pails, Water, Well, &c.—

See Buckets.

Pans—Dripping—

Standard List 65@71@70%

Edwards, Royal Blue 65@71@70%

Fry—

Common Lipped

Pinking Irons—See *Irons, Pinking*.**Pins, Escutcheon—**Brass 50@50¢&10%
Iron, list Nov. 11, '05. .60@60¢&10%**Pipe, Cast Iron Soil—**Standard, 2-6 in. See *Tr. Report*.
Extra Heavy, 2-6 in.
Fittings, Stand. and H'vy.**Pipe, Merchant—**Consumers, Carloads.
Steel. Iron.
Blk. Galv. Blk. Galv.
% % % %
1/8 & 1/4 in. 61 48 57 41
1/2 in. 66 52 59 41
1/4 in. 68 56 61 49
5/8 to 6 in. 72 62 66 56
7 to 12 in. 69 54 61 46**Pipe, Vitrified Sewer—**Cartoon lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class 82%
Second-class 85%
NOTE.—Market irregular.**Pipe, Stove—**Per 100 joints.
Edwards' Nested: C. L. L. C. L.
5 in. Standard Blue. \$6.25 \$7.25
6 in. Standard Blue. 6.75 7.75
7 in. Standard Blue. 7.75 8.75
5 in. Royal Blue. 7.00 8.00
6 in. Royal Blue. 7.50 8.50
7 in. Royal Blue. 8.50 9.50
Wheeling Corrugating Co.'s Nested:
5 in. Uniform Color. \$6.15 \$7.15
6 in. Uniform Color. 6.65 7.65
7 in. Uniform Color. 7.65 8.65**Planes and Plane Irons—****Wood Planes—**Bench, first qual. 30@30¢&10%
Bench, second qual. 40@40¢&10%
Molding 25@25¢&10%
Chaplin-Stephens Co.:
Bench, First Quality 30%
Bench, Second Quality 40%
Molding and Miscellaneous 25%
Toy and German 30%
Union 60%**Iron Planes—**Chaplin's Iron Planes 50¢&10%
Union 60%**Plane Irons—**Wood Bench Plane Irons, list Dec. 12, '06 25%
Buck Bros. 30%
Chaplin-Stephens Co. 25%
Union 50%
L. & J. J. White. 20&50@25%**Planters, Corn, Hand—**Kohler's Eclipse 50¢&10%
Plates—

Fellow lb. 4@4¢

Pliers and Nippers—Button Pliers 75@75¢&10%
Gas Burner, per doz. 5 in. \$1.25
@ \$1.30; 6 in. \$1.45 @ \$1.50.
Gas Pipe, 7 8 10 18-in. \$2.00 \$2.25 \$2.75 \$3.50

Acme Nippers 50¢&5%

Cronk & Carrier Mfg. Co.:
American Button 80%
Improved Button 75@10%
Cronk's 60%
No. 80 Linemen's 50%
Stub's Pattern 45%
Combination and others 35%
Heiter's Farriers' Nippers, Pliers and Tools. 40&50@40&5%
P. S. & W. Timers' Cutting Nippers 60%
Wm. Schollhorn Co.:
Bernard, 35%; Elm City, 35%;
Paragon, 50%; Lodi, 55%;
Swedish Side, End and Diagonal Cutting Pliers. 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds. 40%**Plumbs and Levels—**Chaplin-Stephens Co.:
Plumbs and Levels 30@30¢&10%
Chaplin's Imp. Brass Co. 40@40¢&10%
Pocket Levels 30@30¢&10%
Extension Sights 30@30¢&10%
Machinists' Levels 40@40¢&10%
Diston's Plumbs and Levels 30@30¢&10%
Diston's Pocket Levels 30@30¢&10%
Stanley's Duplex 30%
Woods' Extension 35%**P'st'nt, 'nzlers—**Bulk and 1-lb. papers lb. 10¢
1/4-lb. papers lb. 10¢
1/4-lb. papers lb. 11¢**Police Goods—**Manufacturers' Lists. 25@25¢&5%
Towers' 25%**Polish—Metal, Etc—**Prestoline Liquid, No. 1 1/2 pt. 1 doz. \$3.00; No. 2 (1 qu.), \$3.00 10%
Prestoline Paste 10¢

George William Hoffman:

U. S. Metal Polish Paste, 3 oz. boxes, 1/2 doz. 50¢; 1/2 pt. gro. \$1.50, 1 lb. boxes, 1/2 doz. \$1.25; 1 lb. boxes, 1/2 doz. \$2.25.

U. S. Liquid, 8 oz. cans, 1/2 doz. \$1.25.

Barkeepers' Friend Metal Polish, 1/2 doz. \$1.75.

Stove—

Black Eagle Benzine Paste, 5 lb. cans, 1/2 lb. 10¢

Black Eagle, Liquid, 1/2 pt. cans, 1/2 doz. 75¢

Black Jack Paste, 1/2 lb. cans, 1/2 gr. \$0.00

Black Kid Paste, 1/2 lb. can each. \$0.65

Ladd's Black Beauty Liquid, per 100 tins. \$6.75

Joseph Dixon's, 1/2 gr. \$5.75 10%
Dixon's Plumbago, 1/2 lb. 8¢

Fireside 1/2 gr. \$2.50

Gem, 1/2 gr. \$1.50 10%
Japanese 1/2 gr. \$3.50

Jet Black 1/2 gr. \$3.50

Peerless Iron Enamel, 10 oz. cans, 1/2 doz. \$1.50

Poppers, Corn—

1 qt. Square. doz. \$0.88; gro. \$8.75

1 qt. Round. doz. \$1.00; gro. \$10.00

1/2 qt. Square. doz. \$1.10; gro. \$11.00

2 qt. Square. doz. \$1.35; gro. \$13.50

Post Hole and Tree Augers and Diggers—See also *Diggers, Post Hole, &c.***Posts, Steel—**

Steel Fence Posts, each, 5 ft. 42¢; 6 ft. 46¢; 8 ft. 48¢

Steel Hitching Posts each \$1.30

Potato Parers—See *Parers, Potato*.**Pots, Glue—**Enamelled \$5¢@10%
Tinted 30¢@10%**Powder—**

In Canisters:

Duck, 1 lb. each 45¢

Fine Sporting, 1 lb. each 75¢

Rite, 1/2 lb. each 15¢

Rite, 1 lb. each 25¢

In Keys:

12 1/2 lb. keys \$3.50

25-lb. keys \$5.50

King's Semi-Smokeless:

King's (2) Semi-Smokeless: 55¢

Half Keg (12 lb. bulk) \$3.50

Quarter Keg (6 lb. bulk) \$1.90

Case 24 (1 lb. cans bulk) \$8.50

Half case (1 lb. cans bulk) \$4.50

King's Smokeless: Shot Gun, Rite, Keg (25 lb. bulk) \$12.00 \$15.00

Half Keg (12 lb. bulk) 6.25 7.75

Quarter Keg (6 lb. bulk) 3.25 4.00

Case 24 (1 lb. cans bulk) 14.00 17.00

Half case 12 (1 lb. bulk) 7.25 8.75

Presses—**Fruit and Jelly—**

Enterprise Mfg. Co. 20¢@25%

Seal Presses—

Morrill's No. 1, 1/2 doz. \$20.00 50%

Pruning Hooks and Shears See Shears.**Pullers, Nail—**Cyclops 50%
Myers' Falls, No. 3, 1/2 doz. \$12.00 33%@10%
Morrill's No. 1, Nail Puller, 1/2 doz. \$20.00

Pearson No. 1, Cyclone Spike Puller, each \$30.00

The Scranton Co. Case Lots:

No. 2B (large) 55.50

No. 3 (small) 55.00

Smith & Hemenway Co.:

Diamond 70%
Giant 50%
Staple Pullers, Utica and Davison 60%
Pulleys, Single Wheel—

Inch 1 1/2 1 1/2 2 3

Awning or Tackle doz. \$0.30 .45 .60 1.05

Hay Fork, Sickle or Solid Eye, doz., 4 in. \$1.25; 5 in. \$1.55

Inch 2 1/2 2 1/2 2 1/2

Hot House, doz. 10.65 1.83 1.20

Inch 1 1/2 1 1/2 1 1/2

Screw, doz. 10.16 1.19 .23 .30

Inch 1 1/2 1 1/2 1 1/2

Side, doz. 10.25 .40 .55 .60

Inch 1 1/2 1 1/2 1 1/2

Sash Pulleys—

Common Frame; Square or Round End, per doz., 1 1/2 and 2 in. 17@20¢

Auger Mortise, no Face Plate, per doz., 1 1/2 and 2 in. 20@22¢

Acme, No. 35 1/2 in., 19¢; 2 in., 20¢

Fox-All-Steel, 3 and 7, 2 in., 20¢

Grand Rapids All Steel Noiseless, 50%
Niagara, No. 25, 1 1/2 in., 19¢; 2 in., 20¢

No. 26 Tree, 1 1/2 in., 14¢; 2 in., 16¢

Star, No. 26, 1 1/2 in., 19¢; 2 in., 20¢

Tool's Blocks—See *Blocks*.

Pumps—

Cistern 60%
Pitcher Spout 75@75¢@10¢@10%

Wood Pumps, Tubing, &c. 80%
Barnes Dbl. Acting (low list) 40@5%
Barnes' Pitcher Spout 75@5%

Contractors' Rubber Diaphragm No. 2 R & I Pump Co. 16¢

Daisy Spray Pump 1/2 doz. \$6.50

Flint & Walling's Fast Mail Hand, flow list.

Flint & Walling's Fast Mail (low list) 50%

Flint & Walling's Tight Top Pitcher, 75¢@10%

National Specialty Mfg. Co. Measuring, Nos. 2, \$6.00; 3, \$5.50, 30%
Myers' Pumps (low list) 45%
Myers' Power Pumps 45%
Myers' Spray Pumps 45%

Registers— List July 1, 1903.

Japaned, Electropolated and
Bronzed 66@10%
White Porcelain Enamel 60%
Solid Brass or Bronze Metal, 25%@10%

Revolvers—

Single Action 5¢@10¢@1.00

Double Action, except 44 cal. \$2.00

Double Action, 44 cal. \$2.00

Automatic 5¢.00

Hammerless 5¢.00

Revolver, 44 cal. 5¢.00

Riddles, Hardware Grade

16 in. per doz. \$2.50@2.75

17 in. per doz. \$2.75@3.00

18 in. per doz. \$3.00@3.25

Rings and Ringers—

Bull Rings—

1 1/2 2 1/2 3 inch.

Steel \$0.70 0.75 0.80 doz.

Copper \$1.30 1.50 1.70 doz.

Hog Rings and Ringers—

Hill's Rings, gro. boxes \$4.25

Hill's Ringers, Gray Iron, doz. 60¢

Hill's Ringers, Malleable Iron, doz. 80¢

Blair's Rings per doz. 5¢

Blair's Ringers per doz. 75¢

Brown's Rings per gro. \$5.25

Brown's Ringers per doz. 75¢

Rivets and Burrs—

Copper 33@10%@33%
Carriage, Coopers', Tanners, &c.

Black 70@10%
Metallic Tinned 70%

Bifurcated and Tubular—

Assorted in Boxes.

Bifurcated, per doz. Boxes, Paste-board boxes, 50 count, 23@25¢

Tin boxes, 100 count, 29@32¢

Tubular, per doz. Boxes, 50 count, 29@32¢; 100 count, 51@58¢

Rollers—

Cronk's Stay, No. 50 \$1.00

Cronk's Brinkerhoff No. 55 \$0.80

No. 56, \$0.75; No. 60 \$0.75

Lane's Stay 49¢

Richards' Stay:

Handy Adj. and Reversible No. 53.75¢

O. K. Adj. and Reversible No. 58.50¢

Lag Screw, Nos. 55 and 57 50%

Underwriters', Nos. 59, 60 50%

Favorite, No. 54 60%

Rope—

Manila, 7-16 in. diam. and larger:

Pure lb. 13@13¢@2¢

Sisal, 7-16 in. diam. and larger:

Pure lb. 9¢@4¢

Sisal, 7-16 in. diam. and larger:

No. 2 quality lb. 7¢@8¢

Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:

Mixed lb. 7¢@8¢

Pure lb. 9¢@4¢

Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred:

Mixed lb. 7@7¢@6¢

Pure lb. 8¢@8¢

Cotton Rope:

Best, 1/4-in. and larger, 18@20¢

Medium, 1/4-in. and larger, 16@17¢

Common, 1/4-in. and larger, 10¢

In coils, 1/4-in. advance:

Thread, No. 1, 1/4-in. & 1/2-in., lb. 8¢@4¢

Thread, No. 2, 1/4-in. & 1/2-in., lb. 8¢@4¢

Wire Rope—

Galvanized 37¢@42¢@5¢

Plain 45¢@51¢@6¢

Ropes, Hammock—

Cover Mfg. Co.:

Jute, 35% Sisal 20%

Rules—

Boxwood 60@60¢@10%

Ivory 35@10@35@10@5%

Chaplin-Stephens Co.:

Boxwood 60%

Flexible 40%

Ivory 25@10@5%

Miscellaneous 50@50@10%

Stephens' Combination 55%

Stationers' 50@50@10%

Kingsley & Easer Co.:

Flexible Wood 35@10%

Folding Steel 35@

Scythe Stones—

Pike Mfg. Co., 1501 list:	
Black Diamond S. S. $\frac{1}{2}$ gro. \$12.00	
Lamouille S. S. $\frac{1}{2}$ gro. \$11.00	
White Mountain S. S. $\frac{1}{2}$ gro. \$9.00	
Green Mountain S. S. $\frac{1}{2}$ gro. \$6.00	
Extra Indian Pond S. S. $\frac{1}{2}$ gro. \$7.50	
No. 1 Indian Pond S. S. $\frac{1}{2}$ gro. \$7.00	
No. 2 Indian Pond S. S. $\frac{1}{2}$ gro. \$4.50	
Leader Red End S. S. $\frac{1}{2}$ gro. \$4.50	
Quick Cut Emery... $\frac{1}{2}$ gro. \$10.00	
Pure Corundum... $\frac{1}{2}$ gro. \$18.00	
Crescent... $\frac{1}{2}$ gro. \$7.00	
Emery Scythe Rifes, 2 Coat \$8	
Emery Scythe Rifes, 3 Coat, \$10	
Emery Scythe Rifes, 4 Coat, \$12	
Balance of 1904 list 33% Electro (Artificial), $\frac{1}{2}$ gro. \$12.00	33%
Victor Bottle Stoppers... $\frac{1}{2}$ gro. \$9.00	33%

Stoppers, Bottle—

Victor Bottle Stoppers...	$\frac{1}{2}$ gro. \$9.00
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Stops— Bench—

Millers Falls... Morrill's, $\frac{1}{2}$ doz. No. 1, \$10.00	15&10%
Morrill's, No. 2, \$12.50	50%

Door—

Chapin-Stephens Co.	50@50&10%
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Plane—

Chapin-Stephens Co.	20%
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Straps— Box—

Cary's Universal, case lots... 20&10&10%	
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Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@50&10%	
Socket $\frac{1}{2}$ doz. \$1.00	

Excelsior Stretcher and Tack Ham- mer Combined, $\frac{1}{2}$ doz. \$6.00	20%
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Stuffers, Sausage—

Enterprise Mfg. Co. National Specialty Co., list Jan. 1, 1902... P. S. & W. Co.	25@25&14%
	30&5%

	40&10&5%
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Sweepers, Carpet—

Bissell Carpet Sweeper Co. $\frac{1}{2}$ doz.	
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Superba, Crotch Mahogany... \$6.00	
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Triumph, Fancy Veneers... \$3.00	
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Parlor Queen, Fig. Rosewood... \$30.00	
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Elite, Hungarian Ash... \$29.00	
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Am, Queen, Fig. Mahogany... \$27.00	
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Ideal, Bird's-Eye Maple... \$25.00	
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Grand Rapids, Nickel, \$21.00	
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Japan \$2.00	
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Standard, Nickel, \$22.00; Japan, \$20.00	
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Crown Jewel, Nickel, \$21.00; Jap, \$19.00	
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Crystal, Glass Top... \$36.00	
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Grand, 17 in., wide... \$36.00	
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Club, 21 in., wide... \$34.00	
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Hall, 28 in., wide... \$60.00	
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**NOTE—Rebates: 50¢ per dozen on
three dozen lots; \$1 per dozen on five-
dozen lots; \$2 per dozen on ten-dozen
lots; \$2.50 per dozen on twenty-five dozen
lots.**

**Tacks, Finishing Nails,
&c.—**

American Carpet Tacks... \$9.00	25%
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American Cut Tacks... \$9.00	25%
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Suedes' Cut Tacks... \$9.00	25%
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Suedes' Upholsterers' Tacks... \$9.00	25%
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Gimp Tacks... \$9.00	25%
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Lace Tacks... \$9.00	25%
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Trimmers' Tacks... \$9.00	25%
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Looking Glass Tacks... \$6.00	25%
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Bill Posters' and Railroad Tacks... 90¢ Hungarian Nails... \$8.00	10%
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Finishing Nails... 70%	
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Trunk and Clout Nails... 80%	
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**NOTE—The above prices are for
straight weights.**

Miscellaneous—

Double Pointed Tacks... 90¢ or 5 tens	
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See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co.: Gal. Gasoline	Oil
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30 \$2.75	\$3.00
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60 \$2.50	\$4.00
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100 \$5.00	\$7.75
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Tapes, Measuring—

American Asses' Skin... \$5.00	25%
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Patent Leather... \$5.00	25%
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Steel... \$3.45	25%
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Chesterman's... \$2.50	25%
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Keuffel & Esser Co.: Favorite, Ass Skin... \$4.00	10&10%50%
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Favorite, Duck and Leather... 25&50%25&10%	
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Metallic and Steel, lower part, 35@ 35%5%: Pocket, 35@35%5%	
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Patent Bend, Leather... 25&50%25&10%	
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Pocket... 40@40&5%	
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Steel... \$3.45@35%5%	
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Wiebush & Hilger: Chesterman's Metallic, No. 34L etc... \$2.50	25%
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Chesterman's Steel, No. 1038L etc... \$3.50	35%
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Teeth, Harrow—

Steel Harrow Teeth, plain or headed, $\frac{1}{4}$ -inch and larger... per 100 lbs. \$2.75@3.00	
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Thermometers—

Tin Case... \$10@80¢ 10¢ 5%	
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Ties, Bale—Steel Wire—	
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Single Loop... 80¢ 10¢ 5%	
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Monitor, Cross Head, doz. 70¢ 12¢ 5%	
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Tinners' Shears, &c.—	
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See Shears, Tinners', &c.	
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Tinware—	

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CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:	
1.0 1 $\frac{1}{2}$ in. round and square.....	per lb 2.10¢
1 $\frac{1}{2}$ to 4 in. x $\frac{1}{2}$ to 1 in.....	2.45¢
1 $\frac{1}{2}$ to 4 in. x $\frac{1}{2}$ to 5-16.....	2.30¢
Rods—, and 11-16 round and square.....	Cts per lb
Angles:	
3 in. x $\frac{1}{4}$ in. and larger.....	2.45¢
(except 3 $\frac{3}{4}$ in. and 4 $\frac{1}{2}$ x $\frac{1}{4}$ 2.50¢)	
3 in. x 3 $\frac{1}{2}$ in. and $\frac{1}{4}$ in.....	2.65¢
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ in. x $\frac{1}{4}$ in.....	2.45¢
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ in. x 3-16 in. and thicker.....	2.40¢
1.0 1 $\frac{1}{2}$ in. x $\frac{1}{8}$ in.....	2.45¢
1 $\frac{1}{2}$ x $\frac{1}{8}$ in.....	2.50¢
3 $\frac{1}{2}$ x $\frac{1}{8}$ in.....	2.65¢
3 $\frac{1}{2}$ x $\frac{1}{4}$ in.....	2.75¢
5 $\frac{1}{2}$ x $\frac{1}{4}$ in.....	3.00¢
5 $\frac{1}{2}$ x 3-32 in.....	3.00¢
Tees:	
1 in.....	2.75¢
1 $\frac{1}{2}$ in.....	2.55¢
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ in.....	2.45¢
8 in. and larger.....	2.50¢
Beams:	
Channels, 3 in. and larger.....	2.40¢
Beams—1. to 6 x 3-16 to No. 8.....	2.45¢
"Burien's Best" Iron, base price.....	3.00¢
Burien's "H. B. & S." Iron, base price.....	3.10¢
"Uts er".....	3.10¢
Norway Bars.....	3.00¢
Norway Shapes.....	3.00¢

Merchant Steel from Store—

Bessemer Machinery.....	per lb 2.10¢
Toe Calk, Tire and Sleigh Shoe.....	2.30¢@3.00¢
Best Cast. Steel, base price in small lots.....	.75¢

Sheets from Store—

Black	
One Pass, C.R. Soft Steel. R. G. Cleaned.	
No. 14.....	per lb 2.95..... 3.06¢
No. 18 to 21.....	per lb 3.5..... 3.10¢
No. 27.....	per lb 3.2..... 3.50¢
No. 28.....	per lb 3.3..... 3.60¢

Russia, Planished, &c.	
Genuine Russia, according to assor- men. W. Dow's catalog.....	per lb 113¢@145¢
Painted Planished.....	per lb A, 10¢; B, 9¢, net.

Galvanized.

Nos. 14 to 16.....	per lb 3.35¢
Nos. 22 to 24.....	per lb 3.75¢
No. 27.....	per lb 4.20¢
No. 28.....	per lb 4.45¢

No. 20 and lighter 36 inches wide, 15¢ higher.

Tin Plates—

American Charcoal Plates (per box.)

A. A. A. Charcoal:	
IC, 14 x 20.....	\$.60
IX, 14 x 20.....	1.85

A. Charcoal:

IC, 14 x 20.....	\$.65
IX, 14 x 20.....	1.75

American Coke Plates—Bessemer—

IC, 14 x 20.....	108 lb..... 4.65
IX, 14 x 20.....	5.65

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating.....	\$.90
IX, 20 x 28 with an 8 lb. coating.....	1.00

Seamless Brass Tubes—

List December 4, 1905.

Base price 23¢

Brass Tubes, Iron Pipe Sizes—

List December 4, 1905.

Base price 23¢

Copper Tubes—

List December 4, 1905.

Base price 26¢

Brazed Brass and Bronze Tubes—

List June 6, 1898.

22¢ per lb

High Brass Rods—

16 $\frac{1}{2}$ ¢ per lb

Roll and Sheet Brass—

List June 6, 1898.

16 $\frac{1}{2}$ ¢ per lb

METALS—

Tin—

Straits Pig..... per lb 38¢@39¢

Copper—

Lake Ingots..... per lb 18¢@18¢

Electrolytic..... per lb 17 $\frac{1}{2}$ ¢@18¢

Casting..... per lb 17¢@17 $\frac{1}{2}$ ¢

Sheet Copper Hot Rolled, 16 oz..... per lb 20¢@21¢

" " " " 14 " " " " 14 " " " " 21 " " " " 21¢

Sheet Copper Cold Rolled, 1¢ per lb advance over Hot Rolled.

Sheet Copper Polished 20 in. wide and under, 1¢ advance over Cold Rolled.

Sheet Copper Polished over 20 in. wide, 2¢ advance over Cold Rolled.

Bottoms, Plts and Flats..... per lb 21¢ basis

Polished Copper, 1¢ per lb more than Polished.

Spelter—

Western..... per lb 64¢@64¢

Zinc.

No. 9, base, casks, per lb 80¢@Open..... per lb 85¢

Lead.

American Pig..... per lb 51¢@51¢

Bar..... per lb 62¢@62¢

Solder.

Cookson..... per lb .12¢

Hallett..... per lb .12¢

Other Brands..... per lb .11¢

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:

Small lots..... nominal.

100-lb lots..... nominal.

Old Metals.

Dealers' Purchasing Prices Paid in New York

—Cents—

Copper, Heavy and Wire..... per lb 12.00@13.00

Copper, Light and Bottoms..... per lb 11.25@11.50

Brass, Heavy..... per lb 8.50@9.00

Heavy Machine Composition..... per lb 11.00@11.75

Clean Brass Turnings..... per lb 7.50@8.00

Composition Turnings..... per lb 9.25@10.00

Lead, Heavy..... per lb .40@.45

Tea Lead..... per lb .35@.38

Zinc Scrap..... per lb .40@.45

No. 1 Card Wrought, Long..... \$13.00@15.50

No. 1 Yarn Wrought, Short..... \$12.50@13.00

Wrought Pipe..... \$8.50@10.00

No. 1 Machinery Cast..... \$14.50@15.00

Stove Plate..... \$12.50@13.00

THE IRON AGE

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